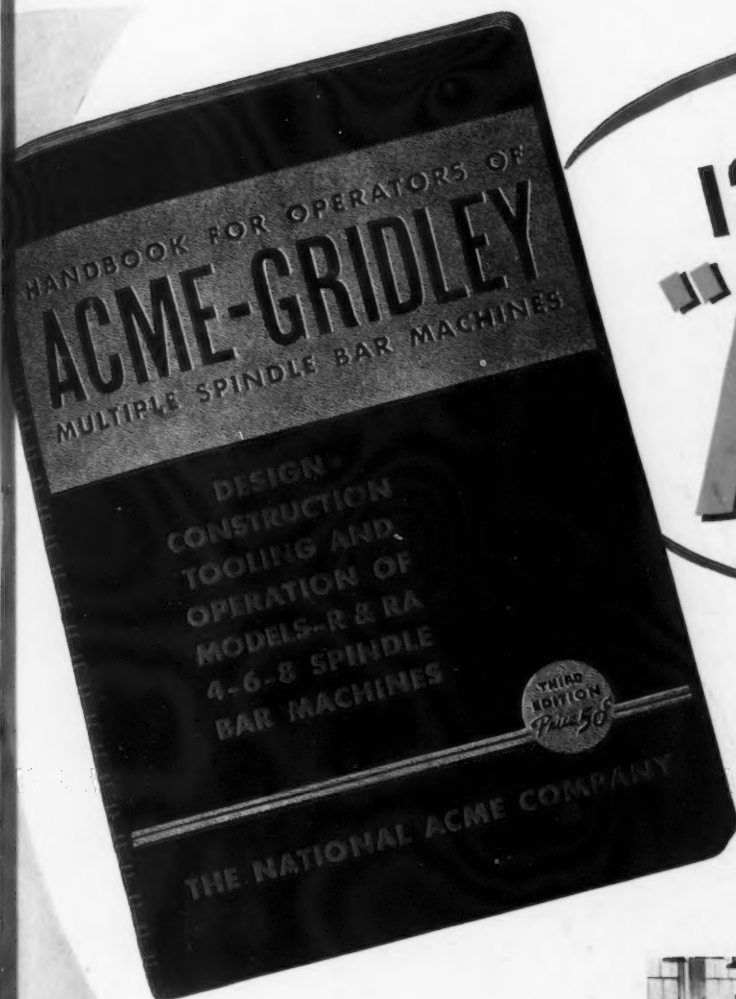


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# IRON AGE



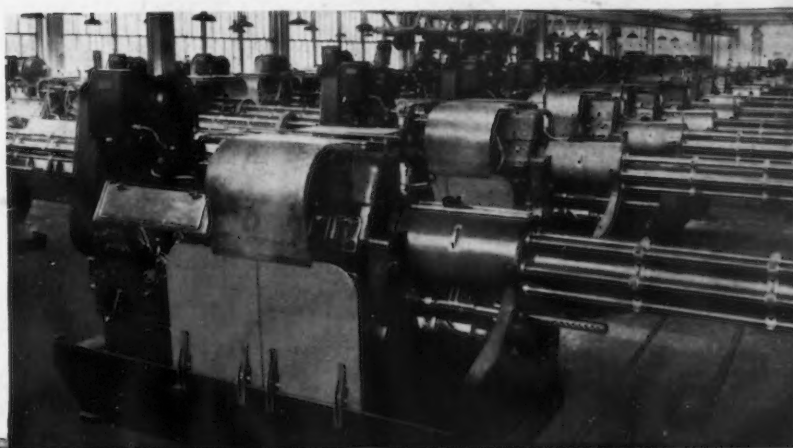
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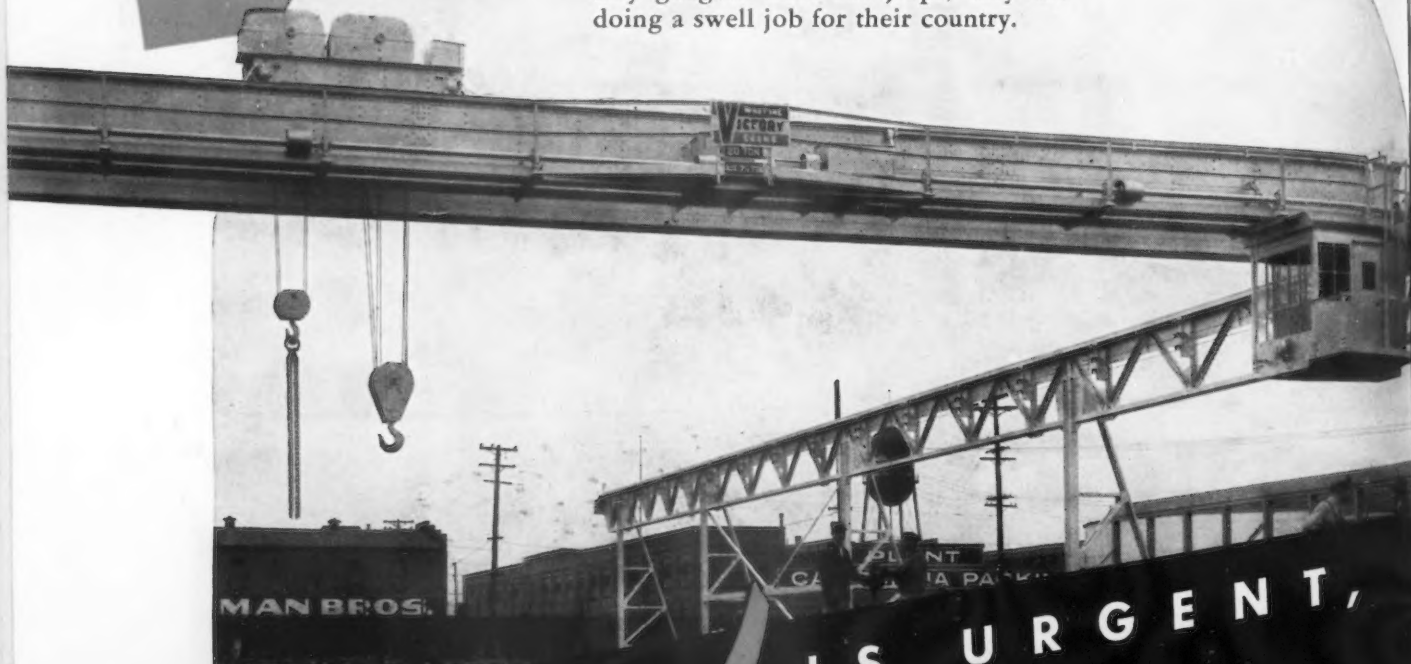
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This Week in...

# THE IRON AGE

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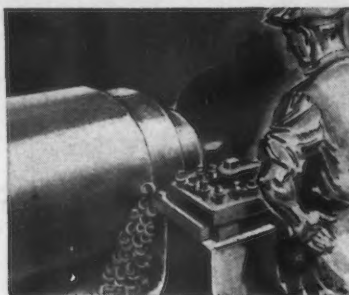
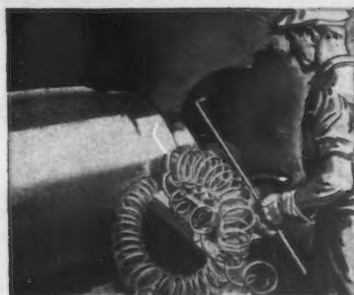
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# THE IRON AGE

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APRIL 15, 1943

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ESTABLISHED 1855



## First Things First

**I**N time of war it is well to concentrate on first things first and let matters of second, third and lesser rating be met and handled in due turn. And the first thing for all of us today is to apply every ounce of energy to winning the war.

This agreed upon, it follows that political considerations, personal preferences, prejudices and jockeying for position in the post-war world should get the red light and be side tracked until the allied war express gets through to its destinations at Berlin and Tokyo.

One of the things that can very well wait until the great decision is the so-called reformation of the patent office, which seems in some political quarters to take precedence over the operation of the Army, Navy, Marines, Air Corps, and Maritime Commission and munition making activities.

This is not to say that the operation of our patent system cannot be improved, when we get time to get around to it. The steam engine is older than our patent system and is still subject to improvement and always will be as long as steam is used as a medium for motive power. But like the patent system, the fundamental principle is sound. No one would suggest throwing out our steam engines because their attained thermal efficiency is less than 30 per cent.

Fundamentally, the American patent system is sound, constructive and creative. Whatever may be wrong with it and subject to improvement lies in certain business practices applying to the use or rather misuse of patents and not the system. We do not condemn water and fire per se because through misuse one of them drowns people and the other burns.

Anthony William Deller who reviewed for the Harvard Law Review, Professor Walter Hamilton's TNEC monograph, "Patents and Free Enterprise," makes some very logical suggestions as to our wartime attitude toward our patent system, as follows:

- 1) For the duration, consider only such patent legislation as pertains to the war program and limited to the war period.
- 2) Immediate steps should be taken to stop the campaign of discouraging and harassing inventors and patent owners.
- 3) Immediate steps should be taken to encourage and assist inventors and patent owners in every way to do their utmost in making inventions which will improve our war effort, to provide the incentive implied in the spirit of the Constitution and the letter of the Law.
- 4) After the war is over, a joint committee of the House and Senate should be formed to take testimony throughout the United States from inventors, manufacturers, those who finance and commercialize inventions, members of scientific and technical societies, faculty members of engineering and technical schools, and all others interested in our patent system, to ascertain what changes, if any, should be made in our patent laws.

If you agree with these logical suggestions, it might be well to let your Congressional representatives know about it.

*Anthony William Deller*





## Don't Throw It Away! *It Isn't a Total Loss*

Great war-time value still remains in cutting tools even though they are broken, or worn beyond further use. They contain precious alloys, some of which cannot be replaced at any price—alloys that are essential for the manufacture of replacement cutting tools—alloys that are vital for the production of war equipment, upon which depend the lives of our fighting men, and ultimate victory.

Machine operators can make a real contribution to the war effort if they will care for their tools—keep them properly sharpened—protect them from damage or loss—use them under

conditions that will give the longest possible life. Many tools are lost or broken through carelessness. Some can be repaired.

But if tools can no longer be used, *don't throw them away!* Gather and segregate them so they can be sent to steelmakers, who will charge them into furnaces, saving all the critical alloys for new tools and war equipment.

An important part of the fight on the home front is to save critical alloys. Work out a plan today to collect and segregate all alloy-steel scrap in your plant.



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# LIQUID NITRIDING

**L**IQUID nitriding or cyanide nitriding has its most extensive application in the "hard surfacing" of finish treated high speed steel tools. The purpose of using such an additional treatment on hardened high speed steel tools is to create a surface considerably harder than it is possible to obtain by the usual heat treating procedures.

In liquid nitriding molten cyanides are used as distinguished from gas nitriding which employs ammonia gas at the nitriding temperatures to

**Surface hardness of hardened high speed steel tools can, by liquid nitriding, be raised from 850 to 1100 Brinell. Such jumps are attended by some hazard unless proper precautions are used. The author here discusses exhaustively the nitriding bath, reactions in the bath, the pitfalls of nickel contamination, and case depth and hardness measurement.**

By J. G. MORRISON

Metallurgist, Landis Machine Co.,  
Waynesboro, Pa.

For other articles on nitriding, see the following articles in THE IRON AGE:

"Nitriding Tank Track Pins," Dec. 18, 1941.

"Nitriding Offsets Notch Weakness," April 10, 1941.

"Nitriding Stainless Steel," Sept. 19, 1940.

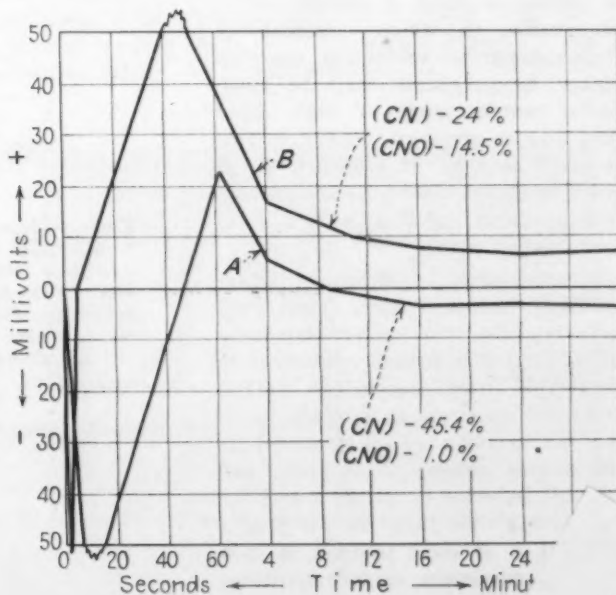
supply the nascent nitrogen. While the Nitralloy steels may be nitrided in molten cyanide baths, the depth of case obtained is so shallow that the exploitation of this method on these steels is extremely limited in scope. On the other hand, gas nitriding has not proved satisfactory for nitriding high speed steel tools, probably because of the inability to control the amount of nitrogen absorbed. Various attempts to gas nitride high speed steel tools have invariably resulted in very brittle tools. Some success in gas nitriding high speed steel drawing dies has been accomplished but this has faded into insignificance with the introduction of carbide dies.

Whether molten cyanides are used at 850 to 1100 deg. F. or ammonia gas is led into a heated chamber at about 975 deg. F., the increased surface hardness resulting by either

method is due to the absorption of nitrogen to form more or less stable nitrides. The hardnesses of the nitrided surfaces are roughly additive of the initial hardness of the steel and the hardness due to the nitrides formed. Consequently, starting with a fully hardened high speed steel tool the absorption of only a little nitrogen at

the surface will result in attainment of a high surface hardness. With the Nitralloy steels, the initial hardness being relatively low, a more considerable amount of nitrogen must be absorbed to obtain a high surface hardness. In liquid nitriding, the depth of case may be so shallow or lean that the microscope will not be

**FIG. 1—**Comparative millivoltage curves obtained when 18-4-1 high speed steel specimens approximately 9/32 x 15/16 x 2 in. are heated at 1050 deg. F. in (A) a freshly prepared 60-40 cyanide mixture and (B) a thoroughly aged mixture.





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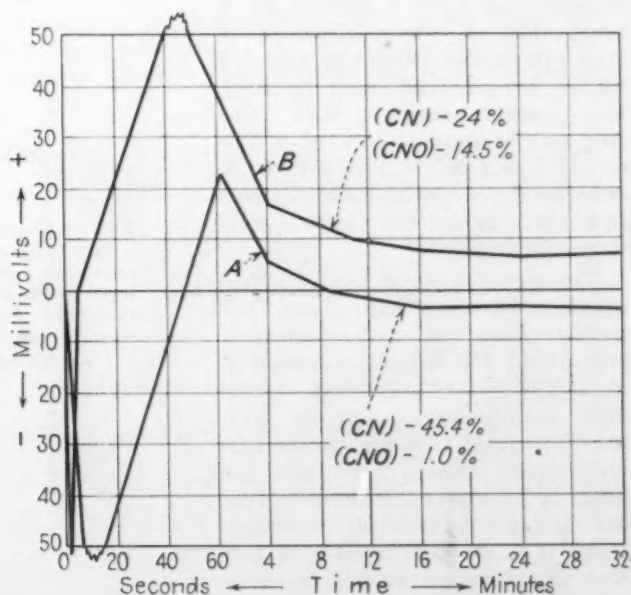
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**FIG. 1—Comparative millivoltage curves obtained when 18-4-1 high speed steel specimens approximately 9/32 x 15/16 x 2 in. are heated at 1050 deg. F. in (A) a freshly prepared 60-40 cyanide mixture and (B) a thoroughly aged mixture.**



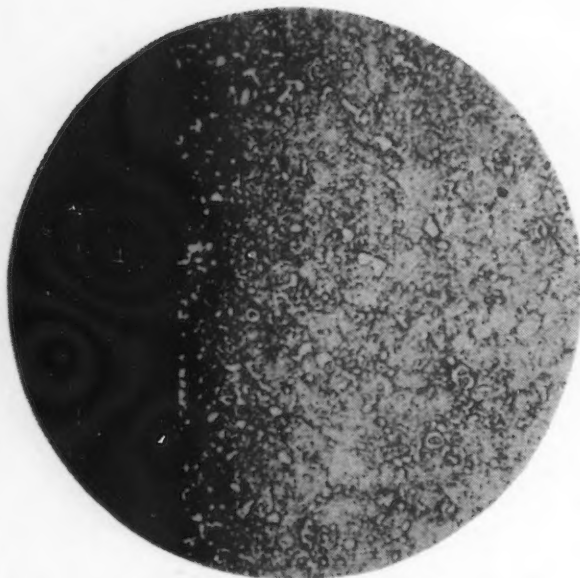


FIG. 2—Section of 18-4-1 high speed steel case after nitriding 1000 deg. F. for 30 min. Etchant, four per cent nital. At 500 diameters.

as revealing as a test file applied to the surface; or it may vary from apparent microscopic depths of several ten-thousandths of an inch to about four-thousandths of an inch. In gas nitriding, considerably deeper cases (about 0.025 in.) are required and obtained.

High speed steel tools may be nitrided for one of several reasons. A tool may be nitrided to reduce the affinity of the metal being cut to seize onto the tool surface. In this event it tends to reduce frictional resistance. Very short immersion periods are used, the case is of extremely superficial depth and the surface hardness only slightly enhanced. In a way, such a "flash" treatment may be comparable in effect to the low temperature oxide coatings formed when high speed steel tools are heated in an aqueous solution of sodium hydroxide and sodium nitrite or similar mixture. Again, the object may be to obtain as hard a surface as is practicable, in which circumstance longer immersion periods or (rarely) higher temperatures may be used. Lathe centers made of high speed steel may be given an immersion time as great as 2 hr. at 1050 deg. F. in order to obtain almost maximum surface hardness together with a relatively great depth.

It is possible by means of liquid nitriding hardened high speed steel tools to raise the surface hardness from about 850 Brinell equivalent to about 1100 Brinell equivalent. Such a great enhancement in surface hardness is therefor attended by some hazard unless proper precautions are used. It is better to nitride a tool for too short a time than for too long a time. It is of some interest to note that the maximum surface hardness

attainable on liquid nitriding hardened high speed steel closely approximates the maximum surface hardness attainable on the gas nitrided Nitralloy steels.

#### The Nitriding Bath

The simplest nitriding bath (and the one referred to throughout this article) as first made is usually composed of a mixture of 60 per cent sodium cyanide and 40 per cent potassium cyanide by weight. The sodium cyanide has a melting point of 1043 deg. F. and the potassium cyanide a melting point of 1152 deg. F. The 60-40 ratio of sodium and of potassium cyanide is used because it roughly approximates the eutectic or the mixture having the lowest melting point. The eutectic mixture for pure salts has a melting point of 936 deg. F. and is composed of 53.1 per

cent sodium cyanide and 46.9 per cent potassium cyanide.

Nitriding mixtures may be made consisting of sodium cyanide, sodium carbonate and potassium chloride; or barium chloride, potassium carbonate, sodium cyanide and calcium fluoride; or barium chloride, sodium cyanide, sodium carbonate, potassium carbonate and calcium fluoride, etc. The primary reason for using these different mixtures is to obtain a cyanide containing salt mixture having a low melting point. All these mixtures with the various components in proper ratio may be prepared to melting points below 930 deg. F. Some claim is made that certain components of these mixtures serve as energizers.

A freshly prepared bath of 60 per cent sodium cyanide and 40 per cent potassium cyanide, if sampled after it first becomes molten, will approximate the following analysis:

	Per Cent
(CN) .....	45.00
(CNO) .....	1.10
(CO <sub>2</sub> ) .....	1.90

Analysis of a bath is reported as cyanide radical (CN), cyanate radical (CNO) and carbonate (CO<sub>2</sub>). A structural analysis of the cyanide as NaCN and KCN and the cyanate as NaCNO and KCNO, etc., would be quite costly as well as of no particular value.

A freshly prepared nitriding bath of the above analysis is not suitable for nitriding high speed steel tools; it must first be aged for about 12 to 16 hr. in the neighborhood of 1050 deg. F. Experience has shown that high speed steel tools nitrided in a freshly prepared mixture are extremely brittle. It should be noted

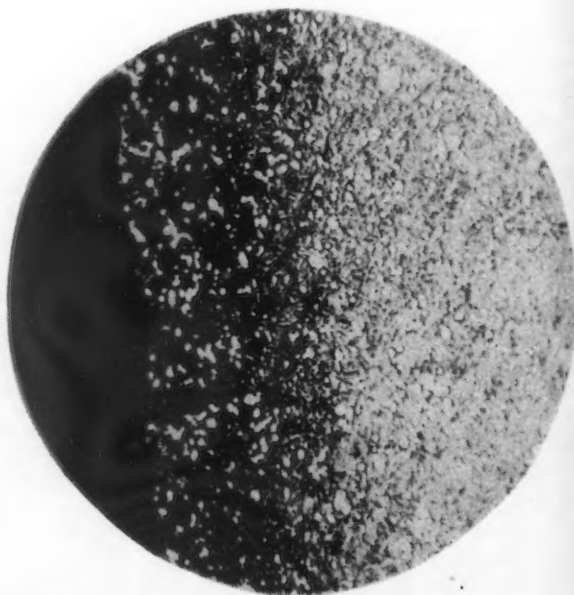


FIG. 3—Section of 18-4-1 high speed steel case after nitriding 1050 deg. F. for 1 1/2 hr. Etchant, four per cent nital. At 500 diameters.

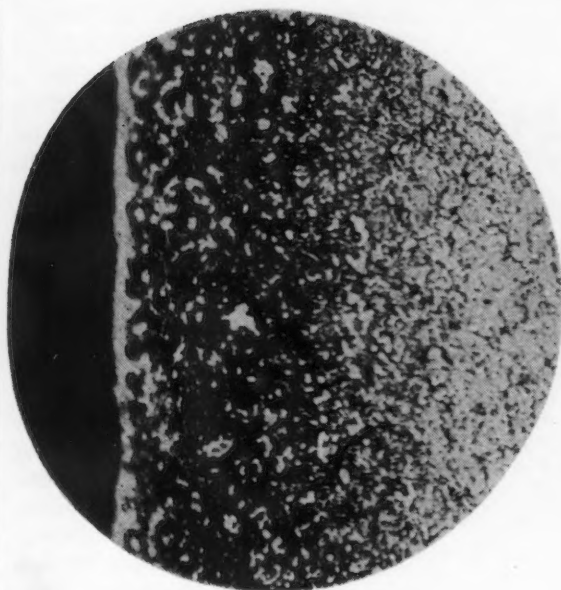


FIG. 4—Section of 18-4-1 high speed steel case after nitriding at 1250 deg. F. for 30 min. Note nickel plate, the result of bath being contaminated with nickel due to the use of nickel alloy pot. Etchant, 4 per cent nital. At 500 diameters.

that the nascent nitrogen available for absorption by the immersed high speed steel surfaces derives from the cyanate radical and not from the cyanide radical. A freshly prepared bath containing only about 1 per cent cyanate is quite deficient in nitriding capacity. That brittle tools result from nitriding in such a bath is probably due to the paucity of nascent nitrogen causing a steep nitrogen gradient at the steel surface. Spalling of cutting edges results in service much as a carburized case may spall due to the carbon graduating too abruptly into the core.

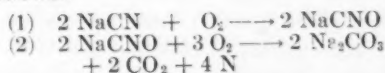
Once the bath (contained in a pressed steel pot) has been maintained at about 1050 deg. F. for 12 to 16 hr. the cyanate will have increased to more than 5 per cent and in this condition satisfactory nitriding of high speed steel tools may be obtained. A freshly prepared bath appears to age more rapidly in a 35 per cent nickel-15 per cent chromium alloy pot than in a pressed steel pot.

Liquid nitriding of high speed steel may be carried out at temperatures of about 850 deg. to 1150 deg. F. provided the bath is thoroughly aged and the cyanate content sufficiently high to insure a bath with a melting point of 800 deg. F. or lower. The higher the temperature of the bath, the faster and deeper the nitrogen is absorbed during the same immersion times. The temperature most usually employed is 1050 deg. F. For gages made of high speed steel where distortion is to be held to a minimum, temperatures in the neighborhood of 900 deg. F. may be employed.

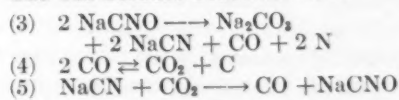
#### Reactions in the Bath

Two sets of reactions may be considered, one occurring at the surface

of the molten salt exposed to the air and the subsurface reactions catalyzed by the immersed high speed steel. The surface reactions are as follows:



The sub-surface reactions are:



Duplicate reactions occur with the potassium compounds and in equations 1 to 5 above, potassium (K) may be substituted for sodium (Na) to complete the list. The most important reaction is equation (3) because it is the nascent nitrogen released here which is available for nitriding. Reaction (4) is an inhibiting one. Were it not for the finely divided carbon (furnished by this reaction) which deposits on the immersed high speed steel surface in an almost plate-like condition, it is probable that liquid nitriding would be the most efficient method of intro-

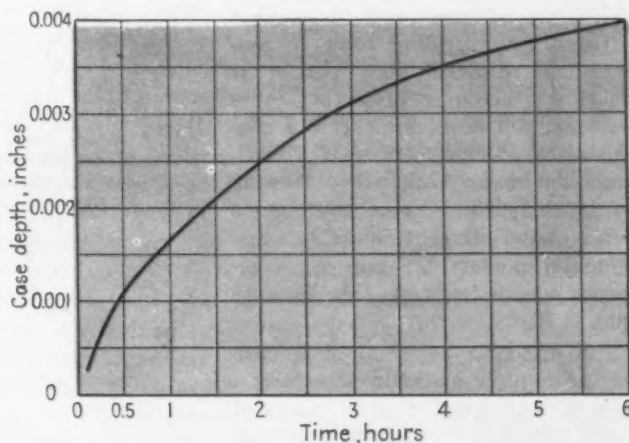
ducing nitrogen into any steel surface.

With continued use, the cyanide of the bath decreases and the cyanate and carbonate increase. A cyanate content of 8 to 15 per cent furnishes a good range for nitriding. If immersion times are relatively long the lower concentration of cyanate is desirable since microscopic pitting and washing away of the steel surface will increase as the cyanate increases. However, where immersion times are relatively short there is little noticeable difference in surface effect. As the cyanate content of the bath increases the melting point of the bath decreases so that with a cyanate concentration of about 14 per cent, the melting point of the bath will be about 775 deg. F.

Regular additions of cyanide are used to replenish the bath. Additions to an aged bath may be made in the ratio 80 per cent sodium cyanide and 20 per cent potassium cyanide in the interest of economy. The latter salt is more expensive than the sodium cyanide. The cyanate content of the bath may be controlled by periodically discarding part of the bath, or by virtue of a combination of quantity of salt material relative to surface area, temperature control and drag-out the desired concentration of cyanate may maintain automatically.

In cooling a thoroughly aged bath from about 1050 deg. F. it will be found that at approximately 925 deg. F. a "salting out" of the carbonate occurs. As carbonate is a reaction end product its periodic removal is desirable and readily accomplished. By permitting the bath to cool to about 875 deg. F. much of the carbonate will "salt out" and fall to the bottom of the pot. By means of a perforated ladle the bulk of the carbonate may be removed from the bath. By this simple expedient and by proper additions, or by discarding

FIG. 5—Apparent microscopic depth of nitrided case obtained on 18-4-1 high speed steel using a thoroughly aged bath at 1050 deg. F. Cyanate about 14 per cent.





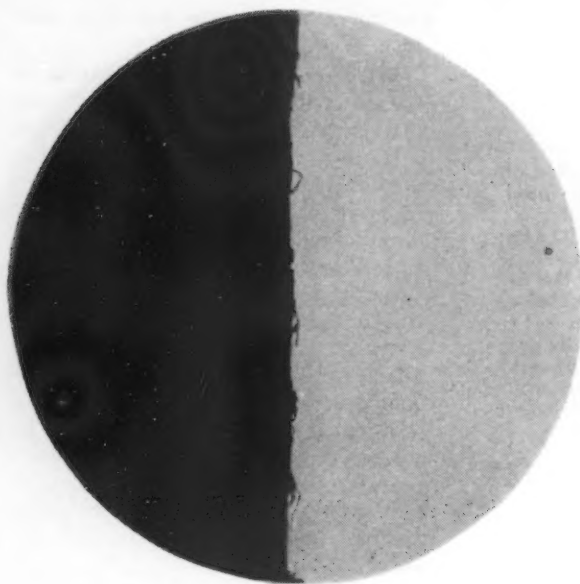


FIG. 6—18-4-1 high speed steel, nitrided 1050 deg. F. for 1 hr. Unetched. At 500 diameters.

periodically part of the salt, a nitriding bath once made and thoroughly aged may last almost indefinitely.

Pressed steel pots are preferable to alloy steel pots because of the quality of surface obtained. The life of the alloy pots is much greater than that of the pressed steel pots and from this standpoint alone would be more economical.

The nitriding potential of a cyanide nitriding bath is determined by a number of factors such as (a) temperature, (b) cyanate content, (c) nature of the high speed steel surfaces to be nitrided, (d) nickel content of the bath, etc. Close temperature control of the bath is essential to obtain good results. The cyanate concentration may be controlled by a periodic analysis of the bath. The high speed steel surfaces to be nitrided are preferably ground, although just as effective nitriding of unground surfaces may be obtained provided no high carbon-high alloy austenite maintains at the surface of the steel. A high carbon-high alloy austenite at the surface of high speed steel behaves similarly to carbide, which does not react with the nascent nitrogen. A nitriding bath if contained in a nickel alloy pot or if nickel thermocouple protection tubes are used, will dissolve nickel to a concentration of 0.008 per cent. Nickel, if present in the bath, will plate onto the immersed high speed steel. As a nickel plated surface is quite soft and as nickel hinders the ingress of nitrogen, a bath free from this contaminant is desirable.

The nitriding potential of a bath may be roughly gaged by attaching a piece of high speed steel by means of a soft iron wire to a glass insulating

rod suspended from above the pot, and leading the wire to a milli-volt meter; through the milli-volt meter a wire lead is attached to the pot containing the salt. When the sample of high speed steel is immersed in the molten cyanide a galvanic cell is the result. By plotting the milli-volt readings against time of immersion we may obtain some measure of the nitriding capacity of the bath. Fig. 1 shows the relative milli-voltage curves obtained when high speed steel samples approximately  $9/32 \times 15/16 \times 2$  in. are placed in a freshly prepared bath at 1050 deg. F. for 32 min. and similar samples placed in a thoroughly aged bath at the same temperature and for the same length of time.

Using a freshly prepared bath there is a peak of about 22 milli-volts registered after about 62 sec., and after about 8 min. immersion to the

conclusion of the test a negative milli-voltage is registered. However, when a thoroughly aged bath is used, a peak milli-voltage in excess of the 50 milli-volt range of the milli-volt meter employed is observable after about 50 sec., and a constantly positive milli-volt reading is obtained over the entire period of immersion. In the case of the freshly prepared bath, little nitrogen was available for absorption by the steel surface due to the low concentration of cyanate. The immersed sample changed from cathode to anode after 8 min., probably because of the pot surface itself exerting a greater breakdown of most of the available cyanate. In the case of the thoroughly aged bath, a considerable amount of nascent nitrogen was available and the immersed sample continued to absorb nitrogen throughout the test period.

#### Measurement of Case

The depth of a nitrided case may be determined by etching a polished section of the nitrided surface. In preparation of the test specimen it is necessary that little or no rounding of the edges occur. As there is generally no alteration to the steel structure as a result of nitriding, the measurement of the case is dependent on the fact that with increase in nitriding time or an increase in nitriding temperature, a deeper and dark colored outer zone is revealed after etching in 4 per cent nital (or other suitable etching solution). As measurement of the case depth is dependent on the color difference between case and sub-surface, it is at best only an estimate of the true case depth. Using a 4 per cent nital solution and

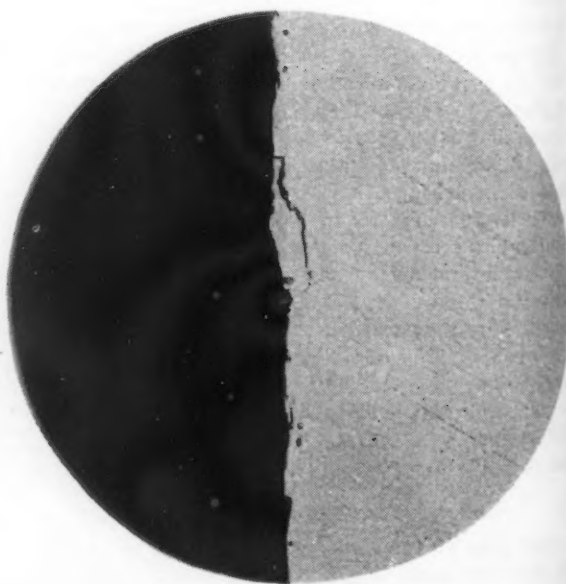


FIG. 7—18-4-1 high speed steel, nitrided 1050 deg. F. for 2 hr. Unetched. At 500 diameters.

immersing the polished specimen long enough just to develop the sub-case structure is perhaps as reliable a method as any.

Fig. 2 shows a micrograph of an edge section of 18-4-1 high speed steel after nitriding at 1000 deg. F. for 30 min. Fig. 3, a micrograph also taken at 500 diameters shows a nitrided case as a result of nitriding at 1050 deg. F. for 90 min. The latter sample, nitrided in a bath free from nickel contamination, reveals an edge free from any nickel plate.

Fig. 4 shows a micrograph taken at 500 diameters of an 18-4-1 high speed steel specimen nitrided at 1250 deg. F. for 30 min. in a bath containing nickel contamination. This temperature is considerably in excess of any which would be commercially applied to high speed steel. The micrograph is intended to show (when compared with Fig. 2) the greater penetration of the nitrogen as the temperature is increased. Since the bath was contaminated with nickel, a continuous plate of nickel was deposited on the surface as evidenced by the white rim in the micrograph. This white rim (more or less continuous depending on time, temperature, etc.) has frequently been mistaken as a "build-up" of carbide.

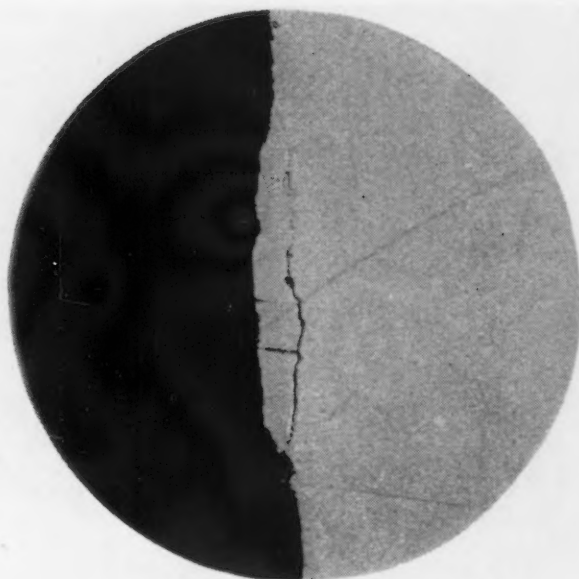
Comparing Fig. 4 with Fig. 3 it will be seen that the apparent depth of case on the specimen nitrided at 1250 deg. F. for 30 min. is much deeper than the specimen (Fig. 3) nitrided at 1050 deg. F. for 90 min. However, if the nitrided edges of the two micrographs are compared it will be seen that the edge of the 1050 deg. F. specimen has a slaty appearance. This slaty appearance near or at the surface is indicative of a relatively high concentration of nitrogen. The lack of the slaty appearance on the 1250 deg. F. specimen may be attributed to the inhibiting effect of the nickel deposit.

Fig. 5 shows the depth of case one may expect on nitriding 18-4-1 high speed steel at 1050 deg. F. for varying periods of time. The parabolic nature of the curve is probably due, in part, to the inhibiting effect of the aforementioned finely deposited carbon on the immersed surface.

#### Hardness of the Cases

Because of the superficial nature of the nitrided case the Rockwell Superficial or the regular Rockwell hardness tests are not adequate to reveal the increment in surface hardness. However, if one polishes one surface of a number of hardened high speed

FIG. 8—18-4-1 high speed steel, nitrided 1050 deg. F. for 3 hr. Unetched. At 500 diameters. This figure and Figs. 6 and 7 show the increasing susceptibility to cracking of the nitrided case when abusively ground. In these cases the cracking resulted when samples were sectioned with a nicking wheel and immediately cooled in water.



steel samples and nitrides them for varying periods of time some rough estimate of the toughness or brittleness of the cases may be obtained by observing the magnitude of the small cracks radiating from the peripheries of the Rockwell impressions. The specimens should be repolished lightly on a broadcloth wheel after nitriding, then Rockwelled and the impressions examined under the microscope at about 50 diameters.

The Vickers hardness tester employing the diamond pyramid and light indenter loads will give a good estimate of the hardness of the nitrided case. The Tukon Tester employing the Knoop indenter appears to be the most searching method for gaging the surface hardness as well as the hardness gradient of the nitride case. Hardness values obtained by the use of the Knoop indenter approximate Brinell hardness numbers. It is possible, as stated earlier, to obtain an increase in hardness of 250 Brinell equivalent numbers as a result of nitriding. The maximum surface hardness as a result of nitriding at 1050 deg. F. appears to be secured after 2 to 3 hr. immersion time. With continued nitriding time there is an increase in case depth but the surface hardness tends to decrease. Using a bath free from nickel contamination favors obtaining of maximum surface hardness in a shorter time.

As is usual with an increase in hardness, there is some sacrifice in toughness. Consequently, extremely hard high speed steel tools which are nitrided to relatively "great" depths will become increasingly susceptible

to cracking in the case if abusively ground. Figs. 6, 7 and 8 are micrographs taken at 500 diameters of the unetched sections of the case after nitriding respectively for 1, 2 and 3 hr. at 1050 deg. F. Specimens simulate the result of abusive grinding, in these instances the result of sectioning the specimens (65 Rockwell "C") with a nicking wheel and immediately cooling them in water.

Any and all high speed steels may be liquid nitrided. Whether the steel is a molybdenum-vanadium type, a Momax type, the 5.5 tungsten-4.5 molybdenum-1.5 vanadium type or the various cobalt types, all may be nitrided to a greatly enhanced surface hardness. There is some reason to believe that those high speed steels with an increasing molybdenum content and a decreasing tungsten content absorb nitrogen at a somewhat faster rate.

Liquid nitriding is no "cure-all." Some types of tools are not sufficiently improved to warrant nitriding. Heavy duty lathe tools probably fall into this class. Surfaces excessively decarburized may have the surface hardness enhanced by nitriding but such practice is to be avoided as extreme brittleness usually results. A ground tool, the surface of which may have been somewhat abusively ground, may often be improved by nitriding. In this instance the surface hardness is increased and at the same time the grinding stresses are relieved. In many classes of high speed steel tools, the use of liquid nitriding results in an almost phenomenal improvement in performance.



# Ladle Metallurgy

By J. H. WILLIAMS

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*... General Discussion Initiated at a Meeting of the London Branch of the Institute of British Foundrymen, and Reported in Foundry Trade Journal.*

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THE oral discussion on ladle metallurgy, opened by J. H. Williams, at a recent meeting of the London Branch of the Institute of British Foundrymen was presided over by the branch president (R. B. Templeton), who said Mr. Williams had rightly emphasized that the maximum advantage of ladle additions was obtained when applied to good metal. This was fundamental. Personally he had had considerable experience with chromes, and this was certainly a most suitable way of adding chromium. The losses involved in alloy additions—this did not apply to nickel but it certainly did to chromium—were a very serious matter. Presumably the alloys became trapped in the slag which formed on the top of the ladle, and it was a matter on which some information would be valuable from those who had had considerable experience.

Mr. Williams had not touched on the ladle addition of copper, which was of real interest. Perhaps it was rather outside the scope of the paper,

but some information on the ladle itself would be valuable. Mr. Wells had touched upon it from the patching and lining point of view, but he would like to hear something about the shape and size and general dimensions of the ladle, particularly from the point of view of the conservation of heat and the elimination of slag.

L. E. Slater, commenting on the actual process of adding the alloy to the ladle, said he had watched his metallurgist doing this, and had noticed that the action of the stream from the spout threw the alloy to the sides. Therefore he had been trying to devise some means of putting the addition into the back of the stream. If one watched the alloy in the ladle, it would be seen to roll towards the stream, but if it were put at the back of the stream it was thrown on top of the roll. Therefore he would be interested to hear if anyone had found a method of putting the addition in the back of the stream so that it rolled on towards the stream and into the ladle.

The branch president said it was possible to have a sort of waterfall arrangement in the spout which helped considerably. If the addition

were put fairly far back there was a step-down in the trough, and that helped to hold the alloy satisfactorily.

Mr. Williams said that he had found it advisable to sift out the dust before adding the alloy. He could not state any definite size of particle, but the alloy should be added in a granular form. If Mr. Slater's metallurgist were adding the alloy in a powdered form, the process was not as a rule satisfactory, because there was a tendency for the powder to be blown away. Additions in the granular form could be made quite satisfactorily with ferrosilicon, ferro-silico-manganese, and also moderately successfully with ferro-chrome.

## Low Losses from Chromex

McRae Smith said he was glad to hear Mr. Williams speak of the great value of silicon additions, apart from other alloy additions, of a purely compositional nature. The author had stated that latterly he had obtained greater success with regard to the reduction of losses by using granular ferrochrome and that he had applied the same principle to the addition of ferrosilicon. Actually, he had been advocating and using powdered sili-



con of high silicon content, but this was not now so easy to procure. If granular ferrosilicon were used, he believed it was necessary to go to  $\frac{1}{4}$ -in. mesh—or the like—which did not get carried away by eddy currents and was not caught up by the slag. Ferrochrome presented difficulties as ladle additions. At one time he invariably added chromium in the cupola as briquettes, but latterly he had used Chromex with great success and found the loss was very small. Personally, he did not feel there was a very great field for ladle additions of ferroalloys in ordinary foundry practice.

With regard to the point raised by Mr. Slater, he agreed that the addition should be made as near to the tapping hole as possible, but it was also very important to see that the shape of the channel was correct. Most jobbing foundries were rather lax in making up the channel anyhow, but if the channel was reasonably shallow and fairly wide the loss was much less because the finely powdered addition had a bigger surface to float on and had a greater chance of being absorbed.

Silicon additions he did not think had been taken as much advantage of as they should have been in the ordinary jobbing foundry. The effect on the graphite structure was more important than the question of increase in strength, and it was very handy in a general jobbing foundry to run a general mixture with a reasonably low silicon content—say 1.5 per cent—and then adjust, where necessary, with silicon additions. This was very easy for any jobbing foundry to do, but it had not been taken advantage of. If extra strength was required with silicon additions, it must be done with reasonably low carbon irons.

Commenting on the written contribution by Mr. Francis, and the stress laid on the two-cupola duplexing method, McRae Smith said this was very useful for the type of job it was originally applied to in this country, viz., chilled castings, but in these days of fuel economy, this process was very expensive in fuel as far as pressure-type castings were concerned. With this type of casting, although the composition was important, it was also necessary to look after the cooling of the casting to get equal or progressive solidification. It was a good method of controlling chill.

#### Size of Alloy Additions

Mr. Williams said he agreed with all that McRae Smith had said, particularly about the cross-section of the spout. Personally, he had never

used ferrosilicon as large as  $\frac{1}{4}$ -in. sized pieces, but he had always taken great care to eliminate dust. In his experience it was much better to sift out the dust in any alloy but it was particularly important with ferrochrome additions. There was an excellent paper on melting practice by Braidwood in the Proceedings of the Institute for 1938-39, in which mention was made of adding 4 to 6 per cent carbon ferrochrome of Brazil nut size to the ladle with 100 per cent recovery, but he had not had the courage to try that.

McRae Smith said he knew of that paper, but he certainly would not have the audacity to do that. However, he had heard of a case not very long ago in which some experienced people used ferromolybdenum of walnut-size after covering the ladle with about 6 in. of metal, and they had obtained extraordinarily good results. The yield of molybdenum was almost the theoretical.

Mr. Williams said that he was surprised to learn that such large-sized pieces of ferromolybdenum could be added satisfactorily to the ladle when one considered the high melting point of the alloy.

Mr. Augstein, speaking of ladle additions of ferrosilicon for castings suitable for the electrical industry, said he preferred to use silicon briquettes in the cupola charge. As to manganese ladle additions, would Mr. Williams enlarge on that subject and state in what particular cases he would suggest this? He agreed that with chromium additions it was very difficult to get a reasonable result by adding crushed ferrochrome to the ladle. In any case, not more than 0.6 per cent chromium should be added in this manner. Referring to the author's remarks on the ladle additions of ferrophosphorus, would Mr. Williams agree that large pieces of phosphoric pig iron could be added to the cupola charge with a similar result?

Mr. Williams replied that he thought he had made it clear—but apparently he had not—that the great value of ferrosilicon additions in a foundry making a variety of castings was the ability to add crushed ferrosilicon to the normal mix if a softer iron was required. In a large jobbing foundry a few castings of a particularly soft kind might be required, but it was not feasible to run a special charge for these castings. In that case it was possible—he had done it many times—to soften up the iron by adding ferrosilicon to the ladle. No doubt they had all met the customer

who complained that his castings were too hard and were not so easily machinable as he would like. What the customer really wanted was something extremely soft, and there was no reason why that wish should not be gratified. McRae Smith had also pointed out the advantage in a jobbing foundry of running a standard mix and adjusting with ladle additions of ferrosilicon. It was possible to soften the iron to any desired extent, and he (the speaker) had made additions so as to bring the total silicon content of the metal up to 2.75 to 3 per cent. He agreed with Mr. Augstein that if the quantity of castings warranted it and it was required to run, say, iron with 2.5 to 2.75 per cent of silicon, then it would be better to adjust the composition of the metal in the cupola by adding high silicon pig iron or silicon briquettes.

With regard to manganese additions to the ladle little attention had been given to them in this country. A paper had been published in America by McPherran, of the Allis-Chalmers Mfg. Co., in which the addition to the ladle of 0.3 per cent of manganese in the form of a ferrosilico-manganese was advocated for scavenging and refining the iron.

For some years he had been concerned from time to time in the production of castings for chemical plant, such as vats, mixers and superphosphate machines. From many experiments he had come to the conclusion that the best iron for these jobs—other than very expensive highly-alloyed irons—was one which was fairly dense, free as much as possible from pinholes, and had a low sulphur content. Phosphorus did not seem to be an important factor. These irons he had made by incorporating briquetted ferrosilico-manganese in the cupola charge, followed by an addition of nearly carbonless ferro-silico-manganese to the ladle and subsequent desulphurization with soda ash. Castings made in this manner and subject to attack by 71.5 per cent sulphuric acid, as in a superphosphate plant, had lasted twice as long as those made from a common iron mix. The iron was poured from a teapot ladle.

Regarding Mr. Augstein's query whether large lumps of phosphoric pig iron could be added to a cupola charge of low phosphoric iron with the same result as adding an appropriate quantity of ferrophosphorus to the ladle, the answer was in the negative. When phosphoric pig iron was mixed with hematite iron in the cupola, little or no superheating

effect was obtained because the metal came down at a temperature corresponding to the melting point of an iron with a given content of phosphorus.

Mr. Scott (Henry Eadie, Ltd.) expressed his interest in what had been said concerning the superphosphate plant having just made one for a customer who asked for it in ordinary cast iron. Could Mr. Williams say what would be the life of the castings he had mentioned as compared with ordinary cast iron?

Mr. Williams replied that he could not say. All he knew was that the castings made in the manner he had described stood up to about double the life of those cast from common iron without any treatment of the metal.

### Graphite and Ferrochromium

A. B. Everest, speaking with regard to inoculation by graphite—which the author had not carried very far—said it seemed from the published information that this was a rather hazardous procedure. He had seen the results of the use of Mexican graphite as an inoculant, and this suggested the form of graphite which could be successfully used was a factor of some importance. In one well known plant which made machine tools for all over the world, Mexican graphite was added, and the makers claimed to get really good castings.

In the early days of alloy addition developments, some people were successful in adding ferrochrome in the ladle but they discarded both the large lumps and the dust. By working in this way it was possible to obtain a satisfactory yield in association with a hot metal, and would be effective for additions up to  $\frac{1}{2}$  per cent. Today he would say that chrome pig was the more satisfactory form.

Another question was the influence of ferrochromium carbon content when making ladle additions. From his own work his impressions were that high carbon, that was 6 to 8 per cent, ferrochrome should give the more successful results, because, if one worked with low carbon, there would be more difficulty from the crushing point of view.

As to phosphorus additions to the ladle, he said it had come to his notice recently that quite a quantity of ferrophosphorus was being sold in this country, and he would like to find out where it went! In the foundry industry there was a tendency to get rid of phosphorus as much as possible, and he was hoping Mr.

Williams would have said what was added to the ladle to reduce the phosphorus.

### Ferrophosphorus

Mr. Williams said he was surprised to hear that there was a comparatively large amount of ferrophosphorus being sold in this country, but he could not imagine it going anywhere else than to foundries. As a matter of fact, he had introduced its use in one or two foundries years ago for the reason given in his opening remarks on the subject of ladle additions of ferrophosphorus. It had a much greater application on the Continent and in America, where low phosphoric pig irons prevailed. Briquetted ferrophosphorus was used to some extent in Germany. He had been informed that there had been no serious increase in the consumption of ferrophosphorus. He, personally, preferred to add ferrochrome whenever possible to the cupola charge. If one were compelled to make ladle additions, then much greater care was required than when using ferrosilicon.

He had intended to omit the question of high or low-carbon ferrochrome, because for some years although certain foundries had ordered 6 to 8 per cent carbon ferrochrome, he believed he was correct in saying that the grade usually supplied was 4 to 6 per cent carbon, as the ferro-alloy makers no longer produced the 6 to 8 per cent carbon grade of ferrochrome. Some 15 years or so ago, the Germans laid great stress on the addition of carbon-free ferrochrome to cast iron. It was claimed that better heat resisting cast iron was obtained by the use of this alloy in place of high-carbon ferrochrome, and the improvement was attributed to a difference in physical structure brought about by the formation of carbides from the carbon already present in the molten iron.

### Multiple or Simple Alloys?

McRae Smith said there was another point with regard to manganese-silicon additions to the ladle. Had Mr. Williams any experience—he himself had not—whether it was more beneficial to use a direct alloy of manganese and silicon rather than, say, a mixture of ferromanganese and ferrosilicon? He believed some recent work had been done in America in which better results had been obtained by using a direct alloy of manganese and silicon than ferromanganese and ferrosilicon.

C. H. Kain remarked that a good

deal of the discussion had been on the question of the provision of small quantities of special metals in the iron foundry. In his view, this seemed to be a complete argument in favor of concentration of rationalization or whatever one cared to call it. Surely in these days the general foundry should avoid these special orders; they should be diverted to foundries catering for that type of material.

Further, there was still a great deal of talk about coarse and fine graphite. He was rather behind-hand in his technical reading, but he felt the time had come when graphite should be reduced to a numerical value. The Cast Iron Sub-Committee of the Institute had done some work in that connection but they had not done anything yet to reduce graphite to a numerical value, equivalent to the McCance grain sizes which were now used for steel.

Replying to McRae Smith on the question of separate additions of ferromanganese and ferrosilicon as compared with a ferro-silico-manganese alloy, Mr. Williams said that the latter was by far the better form of addition and all his manganese additions had been carried out with ferrosilico-manganese. At the same time, although he had not tried it, he could readily appreciate that a ferromanganese with low carbon content would be quite efficacious.

A. B. Everest, commenting on Mr. Kain's remarks thought he had rather missed the point about ladle metallurgy in suggesting that special metals should be produced in foundries laid out for them. Ladle inoculation must be done on a large scale, probably for the whole output of the foundry, for it gave a measure of control which could not be obtained in any other way.

Finally, with regard to coarse and fine graphite, he pointed out that the American standards were being used in this country to some extent.

Mr. Kain suggested they should be used generally and that we should stop speaking of coarse and fine graphite.

Charles Cleaver asked for information with regard to the use of steel turnings in the ladle which he suggested might be highly dangerous, as he rather thought that what was melted was the oxide running through the iron, which resulted in pinholes in the resulting casting. The turnings came to the top in the slag.

With regard to Mr. Kain's suggestion as to the concentration of the industry, this appeared to overlook the fact that specialized foundries



were not inclined to deal with small quantities of odd castings. As a matter of fact, the jobbing foundry came in where the specialized foundry left off.

The chairman suggested that Mr. Kain's point was that the type of casting should be specialized rather than the elimination of foundries which were making general castings.

Mr. Kain replied that ladle metallurgy was practiced daily at his plant for the full output. His previous comment was directed to the point that so much of the discussion had been concerned with the production of small quantities of special metal and he still maintained that

jobbing foundries would be well advised to deflect these orders to foundries which had that particular type of metal in routine production.

### Copper in Cast Iron

Mr. Moyle suggested that the use of copper in cast iron was worthy of consideration, and recalled that in one particular instance some thin castings were made which there was difficulty in machining. A little copper was added to the ordinary mixture, and the customer was delighted with the castings. Therefore, he considered it well worth while for jobbing foundries to make a few experiments in this direction, especially

when copper was relatively cheap. In the particular case in point he used scrap copper such as copper tubes, and the results were very successful indeed.

Mr. Williams in reply to Mr. Moyle, said he could not say anything in regard to copper additions as he had never added that metal to cast iron.

With regard to Mr. Cleaver's remarks, he said he had tried adding steel turnings to the ladle some years ago, and found, as Mr. Cleaver had, that the turnings did not melt. They became entangled with air, and most of them came up to the top of the iron in the ladle.

## Portable Furnace and Ladle for Light Alloys

MORE than 2500 castings for an important piece of Army equipment have been made with a 1000-lb. capacity portable melting furnace and ladle combination at General Electric's Schenectady Works with a negligible percentage of rejects. The portable furnace obviates the need for superheating its charge to the point where oxidation would be excessive, and by permitting a direct pour from furnace to mold, does away with the problems of preheating transfer ladles and crucibles.

The portable combination is a conversion of a standard oil-fired furnace and ladle, trunnion-mounted, with two-eyed plates welded on both of the frame uprights for lifting the entire assembly by a four-hook crane sling.

The furnace is fired by a removable burner easily attached to the sidewall by sliding it into a semi-circular flange and locking it down with a wing nut. The burner fixture fits against the furnace wall at a tangent so that the flame is spiralled downward into the charge. Oil is fed through a flexible metal hose, and air through a rubber hose.

As the casting for which the furnace is used is about  $\frac{1}{2}$  in. thick, the best pouring temperature is 700 to 710 deg. C (1292 deg. to 1310 deg. F). Ordinarily it would be necessary to heat the aluminum charge to as much as 800 deg. C, but with the

portable furnace-ladle combination it is only necessary to go up to 750 deg. C.

The furnace is lined with fire brick, and needed only two relinings in handling more than 2500 charges. A graphite crucible would have had to be replaced much more often.

About one-third of the more than 2500 castings made with the portable furnace were of an aluminum alloy of about 5 per cent silicon, balance aluminum, corresponding to Navy Specification 46A1, Class 2, and among those there were no rejects. What little difficulty was encountered was not the fault of the furnace, but was due to inexperience in handling another metal when a shift was made to an aluminum-copper-silicon alloy (4 per cent copper, 2½ per cent silicon, balance aluminum) corresponding to

Army-Navy-Aeronautical Specification AN-A-4. No "cold shots" were experienced on any of the castings indicating proper temperature.

The portable furnace and ladle combination, loaded with its charge, weighs about three tons.





# Fuze Adaptors Made

**T**HE program of redesigning various items of munitions to conserve critical raw materials, inaugurated by the Ordnance Department of the U. S. Army, and participated in by many commercial firms

with Ordnance contracts, has resulted in some very interesting changes in materials and regrouping of the operations in manufacture. One item, the redesign of which has created considerable interest, is the fuze

adaptor, better described as a bushing or reducer, which allows the use of a fuze of one size with bombs and shells of several sizes.

Redesigns by various manufacturers must of necessity differ as each usually has a different setup as to machines, furnaces, etc. In the Jan. 28 issue of THE IRON AGE the way one maker solved this problem by using presses and a brazing furnace was discussed. This particular adaptor weighs 0.97 lb. and was formerly made by hogging it out of a steel bar weighing 3.83 lb. with the accumulation of 2.88 lb. of steel scrap and the use of 0.23 hr. labor on an automatic screw machine. By the use of presses this adaptor was stamped out of sheet steel in three parts and these parts were copper welded together. Only 1.81 lb. of raw material was necessary and the scrap loss was cut to 0.84 lb., while the machine time

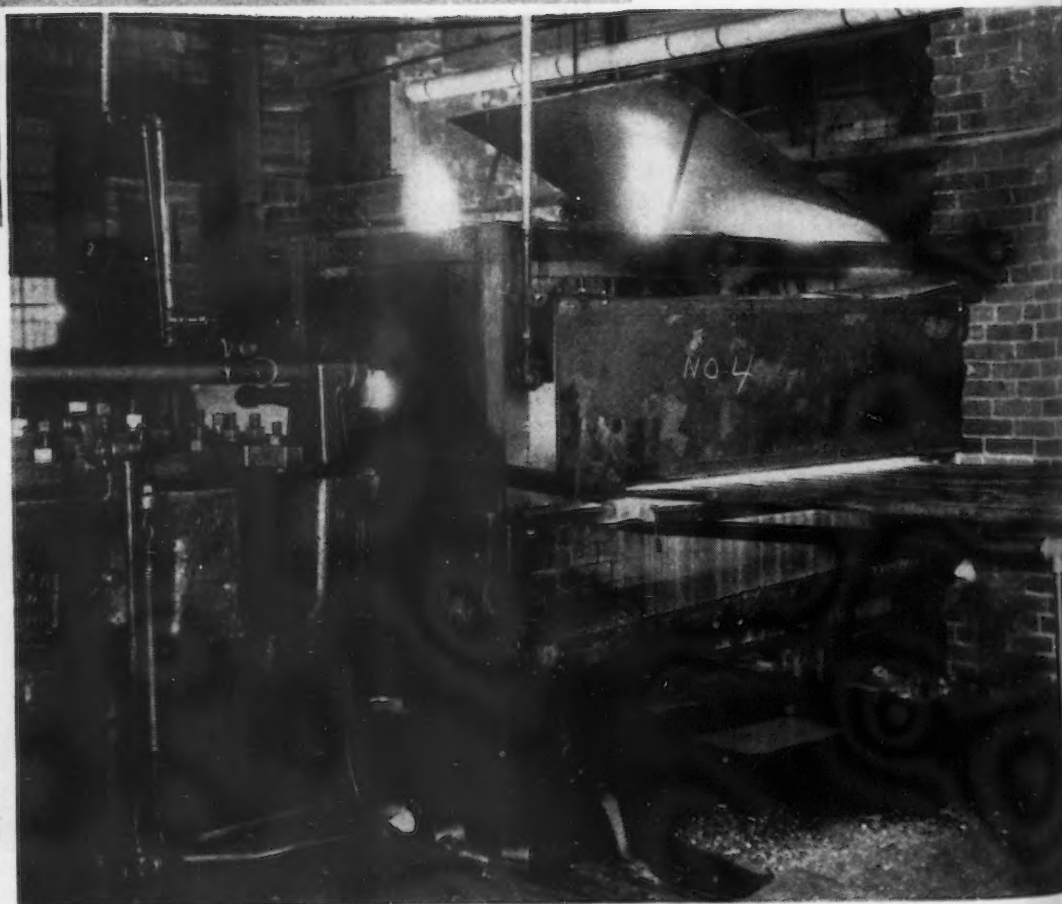


ABOVE

**FIG. 1—**Steps in the upset forging of the adaptor blank. Reading from left to right, the piece is partially upset and partially sheared in the first die cavity; the 2-in. thread diameter is upset and the flange is sized in the second cavity. The slug is pierced and expanded in the third station and is cut off in the fourth. Finish machined adaptor is at extreme right.

RIGHT

**FIG. 2—**Fourteen bars are heated at a time in this oil fired furnace. To keep the heat from the operators, a stream of water pours over the bars and falls into the improvised trough below made from two halves of a hot water tank. Upset forger is at left.



# de by Forging

By LT. COL. J. H. FRYE

Chief, Materials Section, Service Branch,  
Technical Division, Office of the Chief  
of Ordnance, U. S. Army

was reduced 0.045 hr. Copper used in welding amounted to only 0.0035 lb.

Now comes an entirely different method developed by a Midwestern manufacturer of pipe couplings, pipe nipples, hot water furnace coils, etc. This method utilizes an Ajax forging upsetter with a four-cavity die which completes the conversion from the hot rolled bar to a rough adaptor blank in one series of operations at the rate of 150 pieces per hr., Fig. 1. This rough adaptor weighs 2 lb. net. There is only scale loss and the short end of the bar which approximates 10 per cent additional steel loss or a total consumption of 2.20 lb. of hot rolled bar steel to make an adaptor blank. This adaptor blank is now ready for machining after sandblasting.

In order to obtain a true picture of this design and its effectiveness in savings of material and labor, let us compare the stamping method up to this point for the complete adaptor blank. The stamping method, to make an adaptor blank, requires 12 separate press operations in machines varying from 25 to 350-ton capacity. This means 12 men and 12 machines which totals considerable man-hours and a heavy investment in capital equipment, also tremendous die and fixture upkeep and maintenance.

There are also three annealing and brazing processes that are required to complete this adaptor blank. This annealing after draws is accomplished on expensive electric conveyor furnaces which not only are costly, but are very scarce and are a bottleneck in various munition production items. Each of these steps in brazing and annealing requires at least one man per furnace which now makes a total of 15 men, with the press operators, to complete the cycle for the adaptor blank by the stamping method.

We also must consider the total amount of cold rolled sheets that are required to make this adaptor by the stamping method. The pressed steel blank weighs 1.8 lb. per piece, but we must consider the trimming and

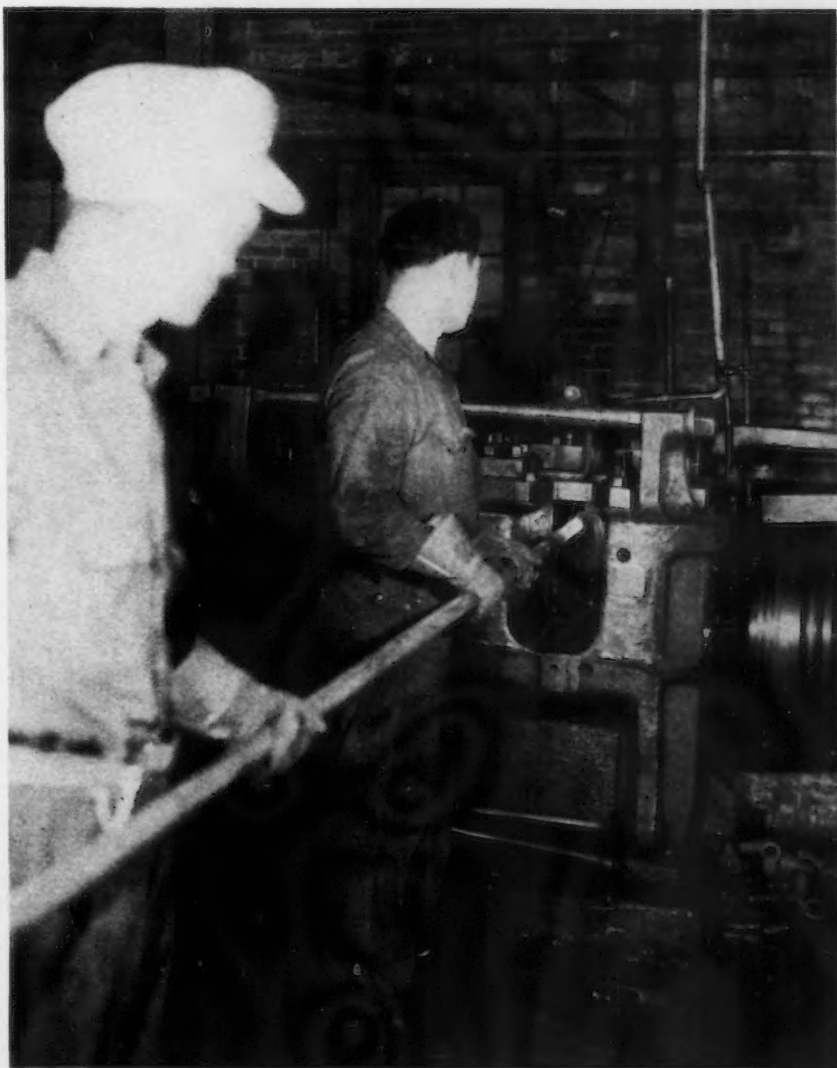
**... One of the by-products of the war effort is the stimulation of competitive processes for making the same item. The author proves here that fuze adaptors made on an upset forger can be turned out cheaper and faster than a composite body made by brazing stamped parts together as described in the Jan. 28 issue.**

blanking operations which normally result in approximately 30 to 40 per cent scrap loss from this sheet steel. Assuming that the scrap loss is 30 per cent we find that by this stamping method the required amount of steel

is approximately 2.35 lb. per adaptor blank. This amount is to be compared with the 2.20 lb. per adaptor blank that is required by the forging method.

Drawn steel sheet is a semi-finished

**FIG. 3—Upset forging operation. Top slot is the No. 1 cavity and the bar is dropped to the fourth cavity before the piece is completed and the slugs drop off. The heater helps the machine operator.**



material and is a more expensive product than hot rolled bars. Also, it is difficult to obtain because cold rolling mills at the steel mills are a bottleneck in present production for armaments. Compare the steel requirements that the forging method employs, namely the rough hot drawn

the electric furnaces and 12 men for the press operations.

Another comparison is the type of steel used. Bessemer screw steel is permitted to be used in making this particular adaptor which is readily machinable at faster speeds and gives a better finish with less die and tool

steel, each 30 in. supplying five adaptor blanks, or a total of 70 blanks across one furnace heat.

2. The 30 in. heated part is placed in the upset forging machine and passed through a series of four cavities which completes the blank by two stages of upsetting, piercing and sizing the hole and finally shearing the blank from the bar.

3. The adaptor blank is sand-blasted to remove scale, which permits longer cutting tool life when machining, drilling, boring and tapping.

4. The blank is rough reamed and counterbored to obtain the inside diameter, and the flange is rough faced. These operations are accomplished on a setup of two drill presses with feeds which finishes this operation at a rate of 90 to 100 pieces per hr. by one operator.

5. The semi-finished hole and flange are now finish reamed, counterbored, and faced on a turret lathe. Two turrets are employed to keep up with the fore-going operation.

6. An automatic lathe is now used to turn the outside diameter and to face the bottom or back end to remove surplus steel and attain a sharper outside corner than is practical with a forging operation. The lathe, which is of the Lo-Swing type also faces the underside of the flange shoulder to obtain a good seating surface and maintain the flange thickness and turns two thread diameters.

7. A small drill press is used to bore and counterbore the 0.172 in. hole for the closing cup, while slotting for the spanner wrench is accomplished on a milling machine equipped with a fixture which holds 12 adaptors in series. Tapping the inside thread is done on a single spindle taper and threading is completed on a double head Landis threading machine, one head finishing the 24 pitch thread and the other head finishing the 12 pitch thread.

The manufacturers claim that the forging method is the most conservative from the standpoint of steel and also man-hours. They claim that this production is easier on tool life than the pressed steel method because they (the forgers) use SAE 1112 steel, Bessemer stock, as against open hearth which is employed by the pressed steel people. Naturally, Bessemer screw stock is much more simple to machine than open hearth, which again saves man-hours.

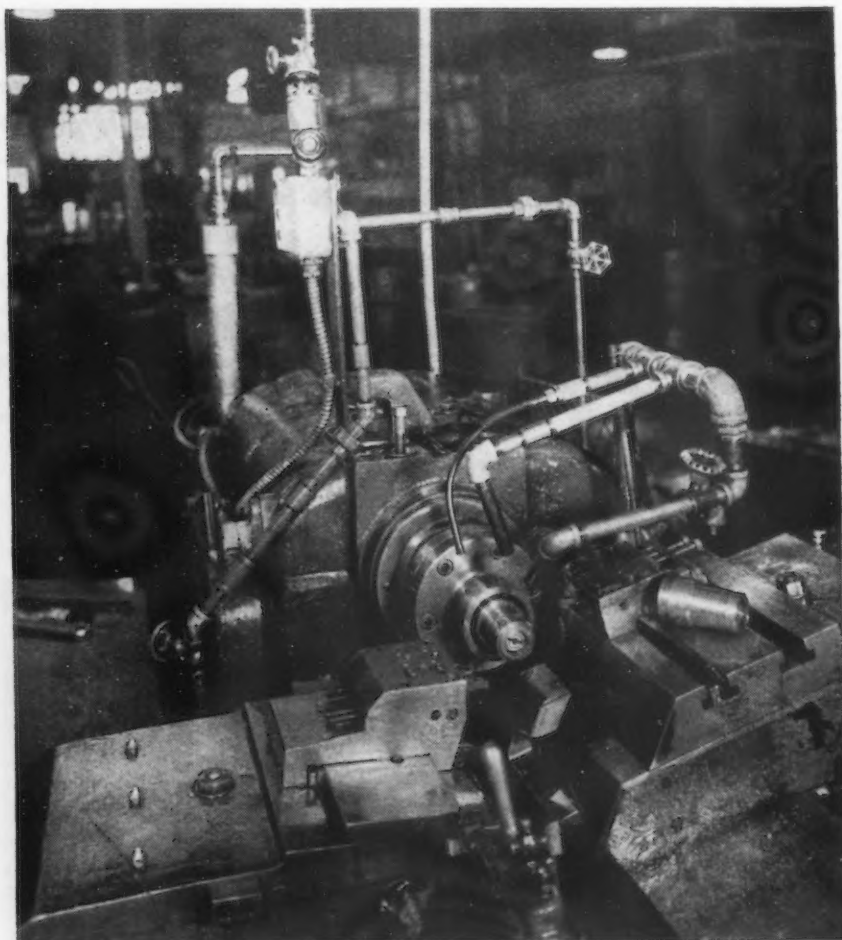


FIG. 4—Automatic Lo-Swing lathe used for turning and forming operations on the o.d. of the body.

bar stock of 1½ in. diameter Bessemer steel, for which there is sufficient capacity at the steel mills.

The next comparison is also very favorable for the forging method of manufacturing this adaptor blank, namely the use of one ordinary oil-fired, home-made furnace and one Ajax upsetter to complete the operation for the adaptor blank. The stamping method for this operation requires 12 presses and three electric conveyor furnaces.

With the labor shortage, another very favorable advantage is the fact that only two men are required as operators, one being a forging heater and the other a forging operator. Compare this with the stamping method which requires three men for

costs, whereas the stamping method employs the use of open-hearth steel which is difficult to machine compared to Bessemer, and the results are not as satisfactory as to finish, comparatively. Also, the turning, threading and tapping tools employed have much longer life when used on Bessemer screw stock as compared to open-hearth drawn steel.

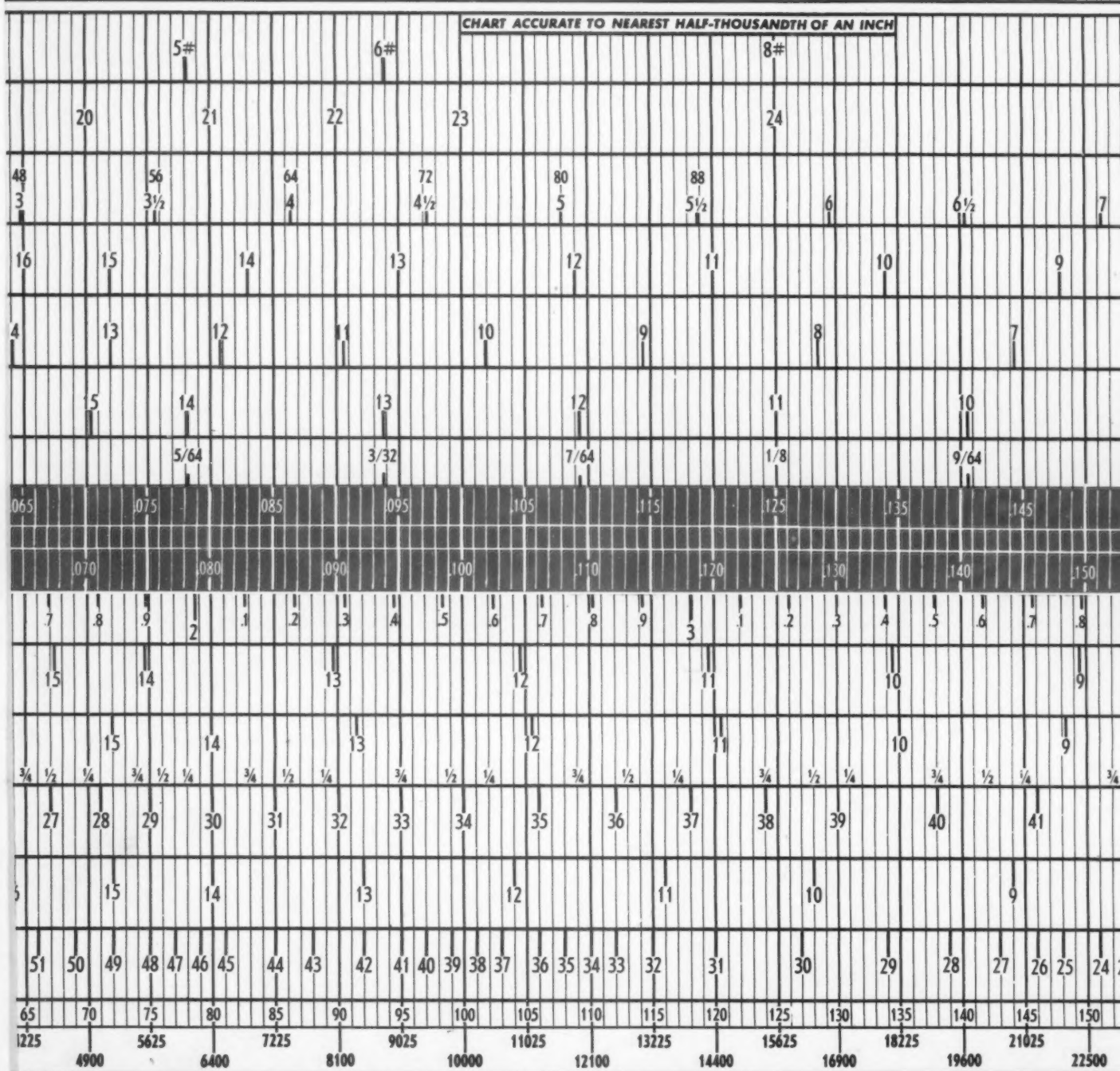
Summarizing the various steps in the manufacture of the adaptor blank by the upset method we have:

1. A 1½ in. diameter hot rolled bar 14 ft. long is heated in a furnace to a temperature of approximately 2200 deg. F. for a length of 30 in. There are 14 slots in this furnace, Fig. 2, which accommodate 14 bars of





# METAL GAUGE COMPAR



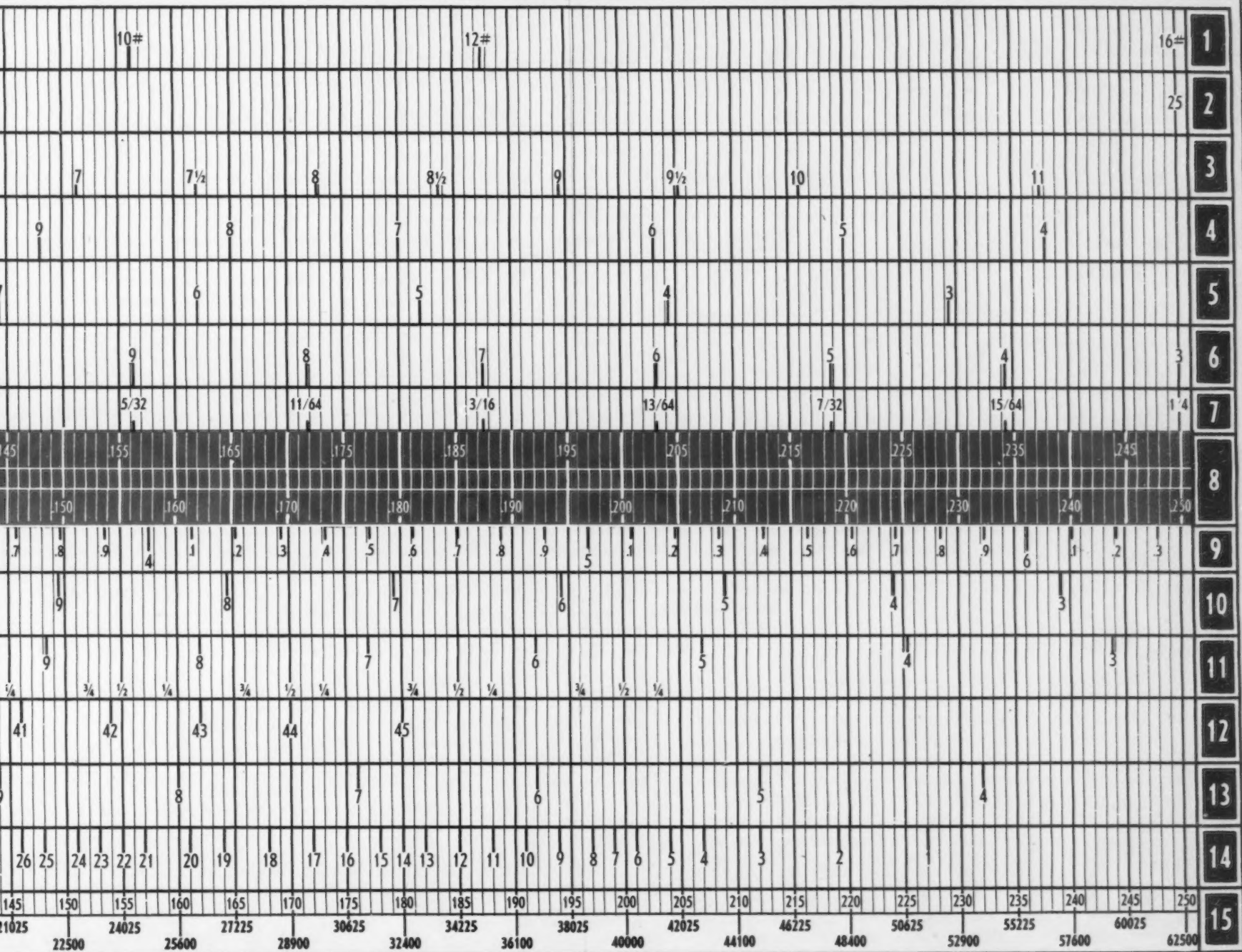
SURE ACCURACY IN ORDERING ACCOMPANY GAUGE AND NUMBER WITH THICKNESS OR DIAMETER (EXCEPTING WIRE SIZES IN CIRC

LEAD	1	MUNTZ METAL	5	NICKEL (Pure)	6	NICKEL SILVER
	Sheets		Sheets		Sheets	
Fractions of an Inch and Decimal Equivalents						
.140625	$\frac{17}{64}$	.265625	$\frac{25}{64}$	.390625	$\frac{33}{64}$	$\frac{41}{64}$
.15625	$\frac{9}{32}$	.28125	$\frac{13}{32}$	.40625	$\frac{17}{32}$	$\frac{21}{32}$
.171875	$\frac{19}{64}$	.296875	$\frac{27}{64}$	.421875	$\frac{35}{64}$	$\frac{43}{64}$
.1875	$\frac{5}{16}$	.3125	$\frac{7}{16}$	.4375	$\frac{9}{16}$	$\frac{11}{16}$
.203125	$\frac{21}{64}$	.328125	$\frac{29}{64}$	.453125	$\frac{37}{64}$	$\frac{45}{64}$
.21875	$\frac{11}{32}$	.34375	$\frac{15}{32}$	.46875	$\frac{19}{32}$	$\frac{23}{32}$
.234375	$\frac{23}{64}$	.359375	$\frac{31}{64}$	.484375	$\frac{39}{64}$	$\frac{47}{64}$
.250	$\frac{3}{8}$	.375	$\frac{1}{2}$	.500	$\frac{5}{8}$	$\frac{3}{4}$



# ARATOR

The war has forced many plants to handle strange types of metals in gage systems with which they are none too familiar. This chart, prepared by R. R. Bostic, of Los Angeles, is a very quick and accurate means of comparing all the commercial gage systems in use in this country by the metal working industry. At the bottom is a handy correlation of fractions of an inch and decimal equivalents. Also at the bottom are all the commercial metals, listed as to type and gage system employed.



INCHES IN CIRCULAR MILS IN DECIMALS OF AN INCH

SILVER		PEWTER	
5	Sheets	5	Sheets
41/64	.640625	49/64	.765625
21/32	.65625	25/32	.78125
43/64	.671875	51/64	.796875
6875	.6875	8125	.8125
45/64	.703125	53/64	.828125
23/32	.71875	27/32	.84375
47/64	.734375	55/64	.859375
750	.750	3/8	.875

MONEL METAL	
6	Sheets
8	Wire (Annealed)
5	Wire (Spring)
6	Strip

STEEL	
8	Chrom Molybdenum
10	Chrom Plated
4	Crucible Tool
10	Galvanized
10	Galvannealed
10	Long Tensile
10	Roller (Cold)
10	Roller (Hot)
4	Stainless (- 24")
6	Stainless (24" +)
11	Wire
5	Clock Spring
14	Drill Rods
8	Flat Spring
4	Flat Wire
4	Hoop
12	Piano Wire

Ribbon Spring	5
Shim	8
Strip	4
Tubing	4

WIRE	
5	Aluminum
5	Brass
5	Bronze
5	Copper
5	Dural
5	Monel Metal
5	Nickel
5	Nickel Silver
12	Piano (Music)
11	Steel

ZINC	
2	Sheets



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# Westinghouse Machine Tool Forum

## Attracts Big Audience

CHIEF engineers, electrical engineers and production engineers from over 100 machine tool manufacturers broke all attendance records at the eighth annual machine tool electrification forum, held by Westinghouse Electric & Mfg. Co., East Pittsburgh. The registration of 296 visitors more than doubled the previous high registration and was indicative of the interest on the part of designers in keeping up with latest developments. There was also the general feeling that machine tool designers are now beginning to cast about for new ideas with which they can dispose of obsolete equipment and thus create post-war markets. A great deal of interest was shown in a new type of electronic motor drive for machine tools and in the application of electronic devices to various basic functions. Not the least interesting of the discussions was a round table forum on hydraulic versus electric drives, which ended in a tie as far as the arguments were concerned.

### What of the Future?

With an oblique reference to renegotiation of contracts, Tell Berna, general manager of the National Machine Tool Builders Association, urged that the machine tool industry be allowed to retain every dollar earned in 1942 in order to carry itself through the next 10 or 15 lean years. Machine tool orders which had peaked at \$367 million in March, 1942, (one-third of total shipments in that year) had dropped to \$72 million in December but will probably level off at \$50-60 million a month for the duration of the war. Shipments peaked at \$132 million in the month of December, 1942, but dropped to \$114 million in February. With a present backlog of \$720 million, the indications are that by the end of 1943, \$4 billion worth of machine tools will have been produced since the war began in 1939, Mr. Berna stated.

What to do with this enormous quantity of new production machinery after the war? That is what is worrying the industry. Some will be kept producing munitions, according to Mr.

Berna, who envisions a gradual fade out of the war and a lengthy period of post-war policing of enemy countries. He dismissed the suggestion that much of this machinery could be shipped abroad to Russia, China, India, etc. (five years of machine tool exports to all countries from 1938-42 amounted to only \$400 million).

Undoubtedly old arsenals will be re-equipped and some of the new ordnance facilities will continue to be operated. One suggestion as to how to reduce the surplus of tools would be to give away machines to high

schools and colleges who would then be enabled to install machine tool courses. This would take some surplus equipment off the market. It has also been suggested that the government freeze all D.P.C. tools and sell them back to the original manufacturers who would rebuild them for resale. This activity would permit the companies to maintain a nucleus of engineering and shop skill in one of our basic industries.

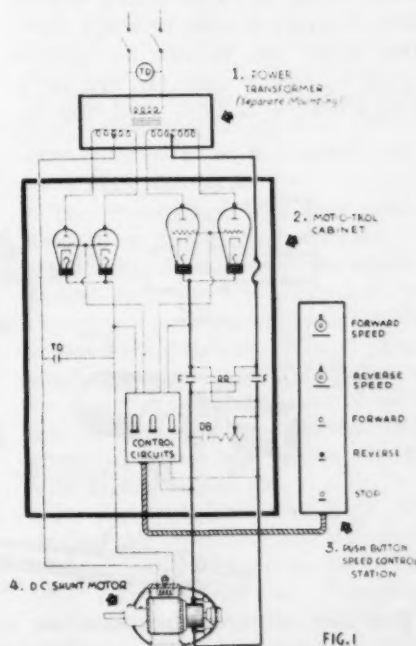
### Obsolescence a Big Factor

Activities of designers in obsoleting present equipment will be the big factor in creating new markets. Mr. Berna concluded that the industry will survive the post-war period despite the "appalling outlook." He indicated that the machine tool builders had put back into plant and machinery more money than they had earned in 1941 and 1942. They will be left with plants entirely too large for normal peacetime outlets and their huge inventories of parts in process will practically be reduced to scrap because of obsolescence.

James Y. Scott, president Van Norman Machine Co., speaking before the banquet that concluded the forum, agreed that the factor of obsolescence is the main hope of the machine tool industry, but he took a much more optimistic outlook on the crucial years which will follow the war. His thesis is that when general business is good, machine tool business is good. He envisioned a great deal of activity in the manufacture of consumer capital goods like automobiles, radios, vacuum cleaners and washing machines, all of which would be in great demand for obvious reasons. He also saw a competitive situation between various transport media such as aircraft, railroads and automobiles that would stimulate retooling for low cost production. He envisioned also packaged power units for automobiles giving 40 to 50 miles to the gallon on 100 octane gasoline.

We are building a mechanical world around us and we are going to bring back from the services 10 million men who have received an excellent me-

FIG. 1—How the Westinghouse Moto-Trol works—incoming a.c. power is converted to d.c. by Thyatron rectifier tubes. These supply the direct current to armature and field circuits of the d.c. driving motor. A potentiometer in the control station varies the voltage of the rectified current supplied to both armature and field circuits by shifting the phase of the grid control voltage of the Thyatron. Both armature and field circuits (controlling the entire speed range possible) are controlled by the one dial on the control station. Some stations provide two dials, for forward and reverse speeds.



chanical education, according to Mr. Scott. He believes that these men will demand new mechanical gadgets which will stimulate machine tool buying.

Mr. Scott indicated that in the past machine tool builders (and Van Norman is one of them) have been reluctant to throw away their old machine tools, but he maintained that after the war his company was going to get rid of all old machines, including an old Garvin miller that was still in service. If others do the same, there will still be a market for machine tools.

### A.C. Speed Control System

One of the latest systems designed to fulfill as many of the desired requirements of an a.c. variable speed motor as possible was described by T. R. Lawson, electronic control engineer of Westinghouse. In general, the Mot-O-Trol system consists of a single or polyphase grid controlled, thyatron tube rectifier, which takes power from an a.c. line and rectifies it into d.c. output which is applied to a regular shunt wound d.c. motor. This d.c. voltage may be varied from zero to motor rated voltage (or above) for armature control. Smaller thyatrons are also used in the control to provide rectified field current, the field voltage being held constant throughout the range of armature voltage change and then being reduced to provide greater speed range by field weakening.

Diagrammatic sketch, Fig. 1, represents a Mot-O-Trol system for 1 hp. and smaller, using single-phase full-wave rectification on both field and armature. For motors of larger horsepower rating a two-phase full-wave or three-phase half-wave rectifier may be used. Different forward and reverse speeds may be present by control potentiometers so that only the operation of the forward or reverse pushbuttons is necessary to obtain a predetermined speed in either direction. Speed also may be adjusted at any time while the motor is running. Speed control potentiometers are tandem type to cover the entire range of armature and field adjustment on a single dial. Adjustment of the potentiometer changes the point on the a.c. line voltage wave at which the tubes fire and thereby varies the output d.c. voltage.

The normal speed range by armature control is 20 to 1 (below the base speed of the motor) though a much wider range such as 100 to 1 is obtainable. Above basic speeds field control is used, normally 2 to 1 for standard motors but limited chiefly by the mechanical limitations of the motor. The standard Mot-O-Trol is designed to automatically regulate the motor

speed, if adjusted for any one speed, so as to maintain essentially constant speed regardless of load. Through other small control tubes the d.c. voltage output of the main rectifier tubes is controlled to compensate for speed changes. In a properly adjusted system, the speed will not vary more than 4 per cent from a presetting (with torque varying from no load to full load value) for a speed range as much as 10 to 1; and not more than 8 per cent for any speed within the speed range of 20 to 1. Normal variations in a.c. line voltage are said to have only a small effect on the speed regulation.

Motors furnished with the Mot-O-Trol system are selected to handle constant torque load over the entire armature control speed range (or up to the base speed of the motor) and constant horsepower over the field control range continuously without exceeding safe temperature limits. The control is arranged so that the motor is always started at full field, regardless of the setting of the speed potentiometer. If the speed is set above base speed, with weakened field, the speed control does not become effective and the field is not weakened until the motor reaches base speed. Through a special current limiting device automatic acceleration is obtained.

### Hydraulic vs. Electric Drives

In a discussion forum on hydraulic versus electric drives, presided over by R. A. Cole of the Norton Co., many pros and cons were brought out but the consensus was that each type of drive had its place for certain applications. It was generally agreed, for example, that the use of hydraulics is better suited to reciprocating motion than to rotary motion, although there were those who pointed out that a hydraulic motor used for driving a lead screw on a table feed, for in-

stance, was generally smaller in size than an electric motor of equivalent capacity and that faster and more accurate reversal could be obtained on applications calling for this type of duty.

On grinders some companies use hydraulic motors on the work spindle and others, electric motors. The difficulty of getting oil lines to headstock motors was pointed out, inasmuch as the headstock has to be traversed with the table. In this connection, it was brought out that it was much easier in general to pull wires through a machine than hydraulic piping. One charge against the hydraulic motor was that it inherently had less overload capacity than an electric motor and hence had difficulty in handling peak loads. With efficiencies of hydraulic motors around 70 per cent, the over-all efficiency of a hydraulic system is only about 50 per cent, which would often mean that 7½ hp. would have to be supplied for a spindle drive where a 5-hp. electric motor would normally do the trick. One company finds it desirable to provide hydraulic feeds and drives on a 10-in. cylindrical grinder, but fully electrical controls on a 6-in. grinder. The latter involves seven rotating units, including two generators. Hydraulic drives are less adaptable to smaller units.

It seemed generally agreed among the forum group that where very low feeds are involved in the matter of a few thousandths of an inch per minute, leakage makes it very difficult to control a hydraulic feed accurately, although there were some to dispute this point. In very slow speeds, throttling of the oil through relief valves and other orifices results in heat and consequent changes of viscosity of the oil and hence variations in leakage past cylinders and valves. The variable delivery pump was pointed to as the way out of this difficulty.

The chief charge against hydraulics

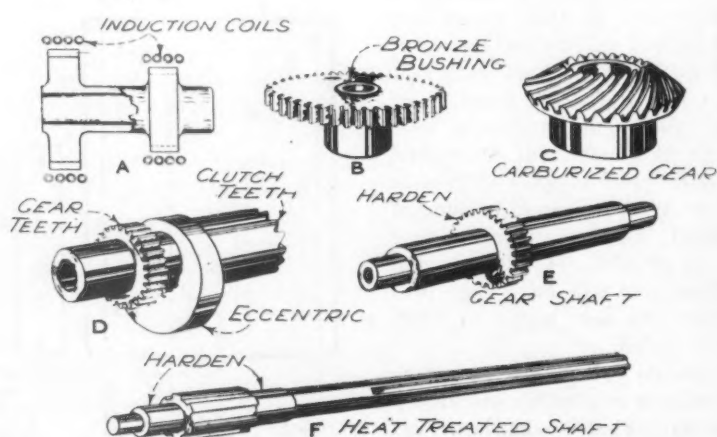


FIG. 2—A variety of parts which are now being hardened by the high-frequency induction method.



in general, however, seemed to be service difficulties and oil leaks. The fact that so many machine tool builders employ their own hydraulic pumps, valves and control systems, whereas most electrical equipment is standard as furnished by electrical manufacturers, is perhaps one clue to some of the service difficulties and the lack of knowledge of servicemen in handling repairs.

### Contacting Analysis

In analyzing motor controls, R. S. Elbert, Jr., consulting engineer, New Britain-Gridley Machine Division, pointed out that there is a close relationship between the functions of a controller and the number of contacts used. A good controller should not have too few or too many contacts, and Mr. Elbert proposed a simple means of checking the optimum number of contacts after the circuits had been laid out. In any one circuit, the first contact furnishes two conditions—circuit closed and circuit open. When the first contact is open, another contact added in series with the first cannot add any conditions to the circuit. With the first contact closed, however, the second contact adds another condition when it is opened. On the other hand, suppose the second contact is added in parallel with the first. In this instance, the second contact can add no conditions to the circuit if the first contact is closed, but can add one condition if closed when the first contact is open.

The same analysis holds for free contacts in combined series and parallel circuits; that is, the number of circuit conditions or control functions is one plus the number of contacts, provided all contacts are free contacts (i.e., not mechanically interlocked).

On the other hand, when contacts are restrained by mechanical or magnetic interlocking or sequencing with other contacts in the same circuit so that only two positions or combinations are possible (two-pole snap-action limit switch, for example) the number of conditions becomes equal to the sum of the free contacts and the restrained contacts. When more complicated restraining contactors are present (drum switches and timing relays) the conditions of control available becomes equal to the number of contacts, or one plus the total number of contacts, since these high-order restraint contacts can do no more than act as free contacts, as far as the analysis is concerned.

### Control of Oil Mist

One of the problems that has arisen in connection with the operation of

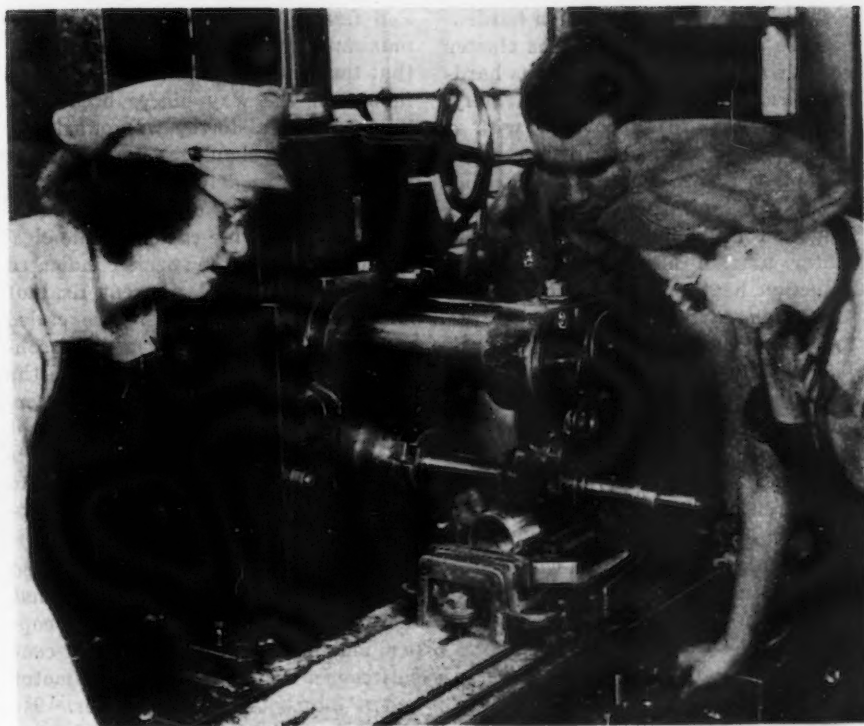


FIG. 3—Where trainees are being groomed to operate machines that are similar in nature, at Kearney & Trecker, several are taught at once rather than given individual attention. This leads to an interchange of discussion frequently helpful to the trainee.

high speed machine tools, like automatic thread grinders and gear grinders, is the fact that part of the coolant oil is broken up into a fine mist which is partly volatilized and gets into the shop atmosphere. This oil mist condenses and collects on everything in the room, including overhead lighting fixtures and often saturates the workers' clothing with oil.

E. H. R. Pegg of Westinghouse indicated that a number of installations have been made in the past year of electrostatic Precipitrons on batteries of Pratt & Whitney gear grinders. In some installations, ducts have conveyed the mist from a battery of machines to a single Precipitron, but Westinghouse's latest recommendation is to install small Precipitron units at each machine so as to avoid cumbersome overhead ducts.

The Precipitron has been widely used in dust collecting systems. In these units, the dust particles are first ionized or given a positive electrical charge by being drawn through a high voltage electrostatic field. These charged particles are then attracted to plates of opposite polarity which are grounded. In between these grounded plates are plates charged with high potential d.c.

In the systems which have been devised for machine tools, the coolant which is removed from the air is literally condensed on the Precipitron plates and continuously run back to the machine coolant sump to be re-

used. In one case, a small unit at one machine collected 4½ gal. of oil in 24 hr. The average, however, is something like 1½ to 2 gal. of oil in 24 hr.

### Future of Induction Heating

Much wider application of induction heating in industry was predicted by Frank W. Curtis, chief engineer, Van Norman Machine Tool Co., who presented a moving picture showing what his company has been able to do with a new type of high frequency induction heating unit. He indicated that in hardening the teeth of an 8-lb. gear, a 43 per cent saving of cost could be obtained by inducting heating SAE 1045 steel over the cost of carburizing SAE 1020 steel.

Since the hardening cycle of a high frequency heating unit is controlled by an automatic timer, it is possible to vary the hardness of a part one way or the other by a slight change in the heating and quench time cycle. If a higher hardness were desired, the heat cycle can be increased or the pressure of the quench and the duration of the flow of water increased slightly. If, on the other hand, a lower hardness were wanted, the length of quench could be reduced a second or so, or a time delay could be incorporated between the end of the heat cycle and the start of the quench. By leaving the quench cycle out entirely, it is possible to anneal the piece. Therefore almost any range of hardness can be obtained at will.

Some examples of induction hardening are shown in Fig. 2. The cluster gear at *A* has both gear sections hardened, each being handled separately. The gear at *B* is provided with a bronze bushing, which can be pressed into place before cutting of the gear teeth since the heat generated during induction hardening will not reach the center portion of the blank. With induction heating, it is also possible to harden carburized parts such as the spiral bevel gear shown at *C*. This procedure is sometimes necessary on spiral gears because the eddy currents of the high-frequency current cause heating more on one side of the teeth than on the other.

Differential hardening, producing different degrees of hardness on the same piece, is also possible with high-frequency induction heating. On the part shown at *D*, the gear teeth are hardened to 54 C Rockwell, the eccentric to 61 C and the clutch teeth to 57 C. With parts as shown at *E*, localized hardening by induction has many advantages, the outstanding being the absence of warpage which eliminates a costly straightening operation. Parts can also be heat-treated, to say 32-34 C Rockwell, then localized-hardened, such as in the case of the shaft shown at *F* which has two surfaces hardened to 62 C Rockwell without affecting the heat-treated portions.

A very practical water-quenching steel for induction hardening is X1340, now SAE C1141. Because of the presence of manganese and sulphur in this grade of steel, it has excellent machining qualities, far better than either SAE 1040, or 1045, and as far as can be determined the manganese and sulphur do not have any affect on hardenability with induction heating. An ideal steel for high-frequency induction hardening applications that has not yet been made, but which can well be visioned as a general all-purpose steel, would be an X1350, or perhaps X1360. With good machinability and with suitable response to induction hardening, as it no doubt would possess, this steel could well fill the requirements for a very broad range of machine parts in many industries.

### Conservation of Motors

In a talk by John Gammell, chief, electrical equipment branch, general industrial equipment division, WPB, machine tool engineers were urged to attempt to secure used motors that are available either in their own plants or elsewhere before buying new electrical equipment, to buy motors of simpler types and higher speeds

and finally to load the motors up to maximum capacity. Mr. Gammell said that there is a lot of machinery stored in out of the way places because it is not essential to the war effort and that a search should be made for the motors used to drive these machines. Despite the efforts of the WPB to locate and put on file cards all idle electrical equipment, the speaker indicated that there are still a great deal of idle second-hand motors. He called attention to the fact that general conservation order L-221 requires the purchaser of standard motors to certify that he has made every reasonable effort to adapt idle motors in his possession, to obtain used motors or to repair or recondition existing equipment.

Urging the use of higher speed motors, Mr. Gammell indicated that there is a difference in weight of copper and steel of 20 to 25 per cent between a 5-hp., 1800 r.p.m. motor and a 5-hp., 1200 r.p.m. motor. He also called attention to the tendencies to over-motorize machine tools. Often a 15-hp. motor is obtained where a 5-hp. motor would do the job.

In another session, R. H. Clark, electrical engineer, Warner & Swasey Co., indicated that for turret lathe applications it is feasible to overload an open type a.c. motor 50 per cent for the heaviest cut taken during a complete cycle in turning out a part. In general Mr. Clark stated that the net horsepower for the heaviest cut or cuts is calculated by formulas or charts, and to this is added the machine loss in horsepower for the particular speed being used. This sum is multiplied by 2/3 and the next size largest standard open a.c. motor above this calculated horsepower is selected as the proper motor for the job.

Mr. Clark indicated that overloading the machine tools could be prevented if proper study were given to proper angles on tools and their grinding. The training film, "Chips," produced by Warner & Swasey was shown by W. J. Pelich, manager of the Operator's Service Bureau.

Another speaker from the WPB was John C. Borden, chief, electrical section tools division. He offered the help of his office in expediting electrical equipment for machine tool builders and ended by explaining limitation order L-250 covering electric motor controllers. One of the purposes of the order, he indicated, was to prevent manufacturers from ordering over-size contactors, because of the amount of strategic metals involved in contactors.

### Training Women Operators

The results of an experimental training program conducted to determine the minimum number of hours of specialized schooling required to train a girl to operate a milling machine were described by Dr. Horace Frommelt, director of education, Kearney & Trecker Corp.

The objectives of this training program were two, namely, to bring these women operators to the point where they were no longer machine shy and to bring them to the level where they were no longer production liabilities. These young women ranged in educational attainments from seventh grade to second year high school. None of them had had previous industrial experiences. The six young women employed first agree to submit to 40 hr. of training and instruction on the operation of the milling machine in a specified vocational school before being assigned to regular production. They were required to pass only a physical examination and to fall within the age range of 21 to 35 years.

Of the 40 hr. of pre-employment training, 20 were devoted to demonstration on an actual operation of the milling machine. The remaining 20 hr. were divided approximately as follows: Eight hours were devoted to teaching of milling operations by audio visual aids, 5 hr. to a review of arithmetic, 4 hr. to measurements and measuring instruments, and the remaining 3 hr. to blueprint reading.

At the end of these 40 hr. of pre-employment training, the women operators were assigned to milling machines in a production line. They were able to operate this equipment without standby instruction or supervision. They were not machine shy, and they were able to make a reasonable showing of production.

These operators were then subjected to an upgrading program of training of approximately 100 hr. Six hours per week (two nights of 3 hr. each) for 16 weeks was sufficient to upgrade these operators to the point where they could be considered as skilled operators in specialized milling machine operations. This procedure for training produced better results more quickly than training an employee for a machine tool operation by assignment to a machine in charge of a regular operator.

In addition, the pre-employment and upgrading program as briefly referred to above, makes possible earmarking potential supervisory personnel such as lead men or women, setup men or women, foremen, supervisors, and others.



# New Equipment . . .

## Motors and Controllers

Recent developments in motors and electrical controlling equipment for industrial plants and factories, together with new floodlights and fluorescent lighting fixtures are described below.

**ROBBINS & MYERS, INC.**, Springfield, Ohio, announces its new line of Uni-Shell electric motors, in which all motor types in any one NEMA frame size are interchangeable. The steel shell dimensions, head fit, bolt circle holes, shaft size and conduit box mountings are identical for polyphase induction motors, capacitor start induction motors, standard d.c. motors and generators, repulsion induction motors, as well as other types. The advantages of motor interchangeability are obvious.

Standard on all ball bearing motors is the double-row ball bearing which has an exceptionally large grease reservoir, and complete seals on both sides held in place by removable snap rings. Equally important improvements have been made on sleeve bear-

rotor balance are available on all types: Static balance, commercial dynamic balance and special dynamic balance.



**Explosion Proof Motor**

A NEW line of vertical hollow shaft explosion proof motors is now offered by *Fairbanks, Morse & Co.*, 600 South Michigan Avenue, Chicago. These motors are designed primarily for pumps handling large quantities of volatile materials, for operation in Underwriters' Class 1 Group D hazardous gas locations.

**Air-Cooled Transformer**

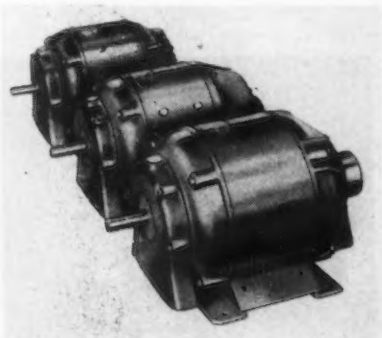
THE air-cooled transformers offered by *Eisler Engineering Co.*, 740-770 South 13 Street, Newark, N. J., are said to offer advantages heretofore unobtainable with trans-



formers using liquids for an insulating and cooling medium. Because of its new type, safe construction, the transformer may be located anywhere indoors without the need of building a protective vault. Elimination of insulating oil and various devices reduces inspection and maintenance. The unit is light and compact and may be placed near its load center. These transformers can be furnished up to 500 kva. in voltages to 4800 volts, single phase, three phase and Scott connected three to two or two to three phase in one unit.

**Nofuze Circuit Breaker**

A NEW type ANC air circuit breaker, designed to meet the circuit protection requirements on aircraft electrical systems, tanks, trucks and similar mobile equipment using a d.c. power supply of 28 volts or less, is announced by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh. The breaker affords both circuit operation and protection in one unit that can be installed in the same mounting space as the present toggle switch. A rating of from 5 to 50 amp. at 28 volts d.c. is available and a 1500 amp. interrupting capacity. The unit



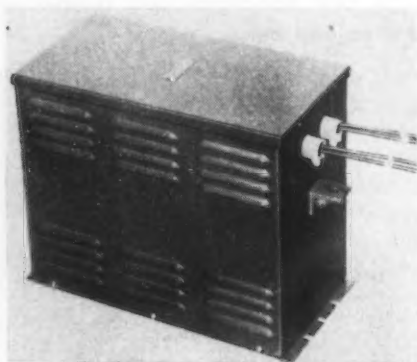
ings for Uni-Shell motors requiring them. Highest quality cast bronze bearings, with surfaces burnished to a high finish, are used on both wool-packed and ring-oiler types. Good bearing alignment and rotor construction in Uni-Shell motors, together with precision balancing, prevents vibration that injures bearings and shortens their life. Three grades of



is manually operated with a 50 deg. swing of the handle from the "off" to "on" position. Circuit protection is accomplished by means of a bimetallic trip.

#### Voltage Stabilizer

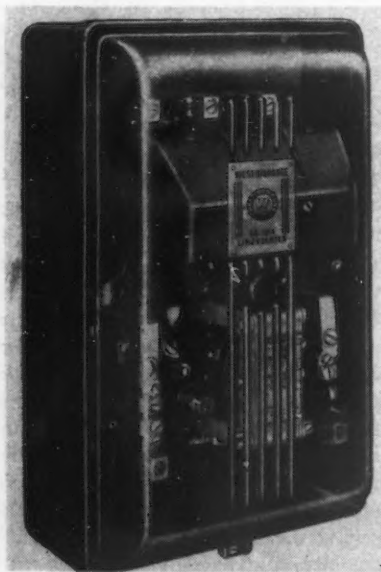
**GENERAL ELECTRIC CO.**, Schenectady, has announced a new voltage stabilizer which provides a constant output of 115 volts from circuits varying between 95 and 130 volts. This stabilizer is not affected by variations in load from no load



to full load or by changes in power factor from unity to 0.8 lagging. It is self-protecting and will operate continuously throughout the range from open circuit to short circuit without damage. The stabilizer can be applied wherever close voltage regulation is requisite to good operation of low power apparatus and measuring instruments. Ratings from 50 to 5000 va. are available.

#### Linestarter

**FOR** machine tools, pumps, fans and similar machines, a new Size 2 glass 11-200 linestarter requiring less than half the mounting space



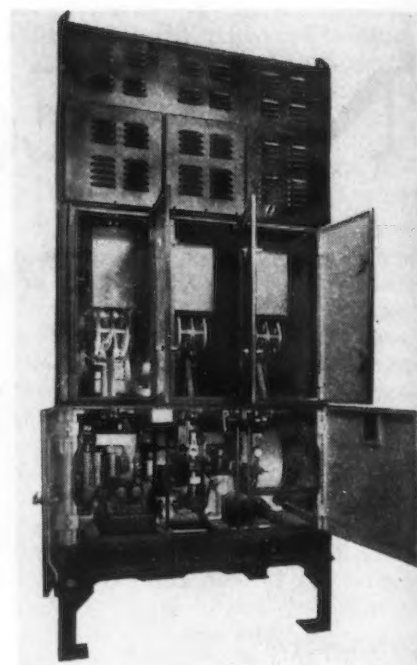
of former units without sacrifice of wiring space is announced by *Westinghouse*. This linestarter has a new clapper-type armature with knife-edge bearings. It utilizes double-break silver-to-silver contacts. Overload relays are reset either by hand or automatically. On applications requiring sequence or auxiliary interlocking, provision is made on the linestarter for a total of four normally open or normally closed electrical interlocks. All parts of the new unit are accessible from the front and all control circuit terminals and interlock terminals are clearly marked for easy installation and repair.

#### Boric Acid Fuse

**FOR** outdoor power systems a new weather-protected intermediate duty boric acid fuse which interrupts the circuit to the faulted equipment, and isolates the fault from the feeders with a complete 180 deg. air break is announced by *Westinghouse*. In the new DBA-1 fuse the blown fuse unit is dropped out of the circuit after the fault current is interrupted. Thus there is no possibility of burning contacts or arcing between fuse tube and clips, or of any carbonized fuse parts breaking down to produce leakage or a second fault. Other features are the "de-ion" boric acid arc quenching action and the sleetproof ejector mechanism for all-weather operation. The DBA-1 fuse is available in voltage ratings from 7.5 through 69 kv. It is applicable for protecting power transformers, feeder-circuit sectionalizing, distribution transformers, high voltage capacitors and potential transformers.

#### Frequency Meters

**THE FRED E. GARNER CO.**, 43 East Ohio Street, Chicago, has announced production of four new models of their Telrad line of frequency meters. All models are crystal-controlled and, by means of a class "C" harmonic amplifier circuit embodied in units, accurate frequency carrier signals are provided every 10 kc and every 100 kc from 100 cycles to 45 megacycles. A carrier signal is also produced every 1000 kc from 1 megacycle to 120 megacycles. A convenient panel-mounted "on-off" switch permits use of a 1000 cycle modulated note. Besides application to measurement of radio circuits, the instruments should find a place in the application of electronics to high frequency induction heating apparatus. Models are available for either a.c. or portable battery operation.



#### Air Breaker

**COMPRESSED** air braker rated 15 kv., 1,000,000 kva. interrupting capacity has been designed and built by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh, for industrial plants where dirt is prevalent in the atmosphere. Four 4000-amp., 25-cycle, type 150-CA-1000 breakers as shown are to be used at 12 kv. on purchased power line and feeder service. Air breakers such as these eliminate fire hazard and maintenance associated with oil breakers.

#### Limit Switch

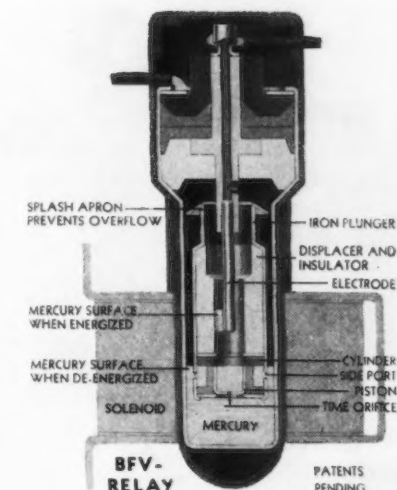
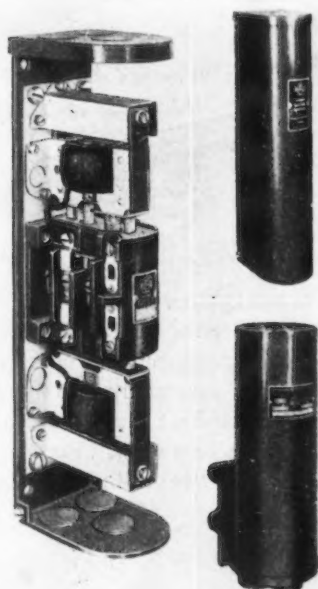
**FOR** general purpose applications, a new type LS limit switch of the roller arm, spring return type is announced by *Westinghouse*. The switch is designed primarily for making and



breaking control circuits or indicating circuits at a fixed point in the operating cycle. It uses replaceable double-break self-aligning silver-to-silver contacts and there is a set of normally open and normally closed contacts. The operating arm can be set in any one of 30 positions and is available in two sizes. The standard arm is 2½ in. and the short arm is 1½ in. between centers.

#### Magnetic Reversing Switch

THE new improved 5-hp. Furnas magnetic reversing switch, made by the *Furnas Electric Co.*, 447 McKee Street, Batavia, Ill., is made as a single unit instead of being made up of two separate contactors. This



mended where dust and dirt are present and in moist and explosive fumes. The hermetically sealed mercury relay is unaffected by elements which ordinarily oxidize and disintegrate the contacting materials. Capacity up to 75 amp. with solenoids wound to meet any voltage and frequency are available.

#### Voltage Tester

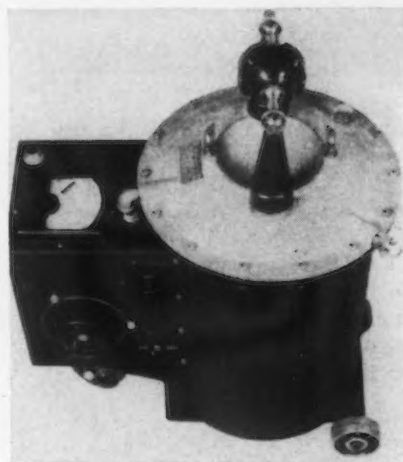
THE new model 590 voltage tester made by *Superior Instruments Co.*, 227 Fulton Street, New York, reads like a thermometer. By connecting the needle pointed test prods across any line, this instrument will indicate the voltage and type of current. Four individual General Electric type NE-7 neon bulbs used in conjunction with a network of resis-



tors provide most of the services necessary for all industrial electrical maintenance.

#### Insulation Testing Set

AN improved 35,000-volt oil and insulation testing set, which can be converted for high potential tests on a variety of materials and products, is announced by the transformer division of the *General Electric Co.*, Schenectady. The set consists of a 2-kva., 35,000-volt, liquid-immersed testing transformer; an air-cooled variable voltage autotransformer; an air circuit breaker for opening the circuit after the test is completed; an oil-testing receptacle; a push button station and a double-range voltmeter for accurate indication of the insulation breakdown voltage. All these parts are mounted



as a unit on a three-wheel ball-bearing truck for easy portability. The oil-testing receptacle is easily removed to convert the set for standard high potential tests.

#### Fiber Glass Cable Hanger

FOR use in mines, shipyards and on construction projects, a durable, glass-fiber cable hanger has been developed by *Westinghouse*. The strap



design allows for reducing the switch to a compact size and eliminates internal wiring. It is especially suited for severe plugging service and other heavy duty applications. Large, double-break silver contacts and the absence of pivots or bearings make this a long-life switch giving maximum trouble-free service.

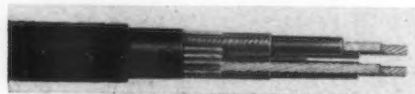
#### Time Relay

SERIES BFV Durakool time relays, manufactured by *Durakool, Inc.*, 1010 North Main Street, Elkhart, Ind., can be used in modern communication systems and machines, motors and electrical circuits where a delayed action is required before a secondary or auxiliary circuit is called upon to operate. The relays have a delayed action in closing the circuit and a quick reset. The tube is filled with an inert gas, which cools and quenches the arcing. It is recom-

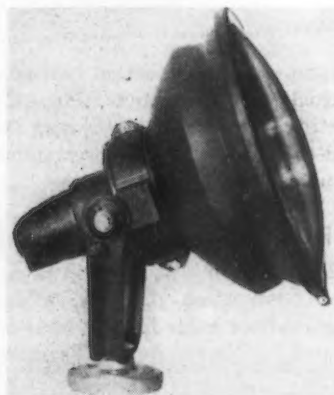
is impervious to moisture and will not rot, stretch or shrink. It is capable of supporting approximately 200 lb. Standard size hanger is 14 in. long and 1½ in. wide. A ½-in. metal grommet in each end permits nailing to wooden pillars.

#### Bus-Drop Cable

A NEW bus-drop cable which carries power from bus bar to individual motor driven machines is announced by the wire and cable section of *General Electric Co.*, Bridgeport, Conn. The cable can be used in new or conversion wiring or as a maintenance item. It can be hooked up easily and quickly in LVD or bus-



duct systems. The cable consists of three stranded conductors, rubber insulated and braided, and a bare stranded ground wire. These conductors are cabled with saturated jute fillers and presaturated paper and tape. Over-all is a long wearing rugged loom weave with a finish that resists oil, grease, gasoline, moisture and is flame retarding.



#### Floodlight Reflector

AN outstanding feature of the new L-43 floodlight, offered by *General Electric Co.*, is a bowed-in silvered-glass reflector which creates the equivalent of a larger floodlight in its collection and utilization of light. The shape of the reflector makes it possible for light to be reflected back to the parabolic surface, where it is redirected outward as part of the main beam. A standard 1000-watt general service lamp is used with the unit. This floodlight can be equipped with a metal visor for use in dimout areas where outdoor night work must continue.



#### Emergency Lighting Unit

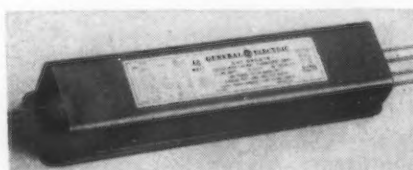
REQUIRING no fixtures or wiring other than plug-in connections to the a.c. supply, the new Exide Lightguard emergency lighting unit is announced by the *Electric Storage Battery Co.*, 19th Street & Allegheny Avenue, Philadelphia. It throws a beam of light 50 ft. wide a distance of 150 to 200 ft., covering an area of 7500 sq. ft. Because it is a self-contained, light-weight unit, it can be moved from its customary position during an emergency. The unit operates automatically without a hand touching a switch. Illumination is provided by a sealed-glass type pre-focused auxiliary driving lamp.

#### Floodlight Projectors

TWO new model RDS floodlighting projectors have been introduced by the *Benjamin Electric Mfg. Co.*, Des Plaines, Ill. A special focusing mechanism permits placement of light where needed without waste. Units are furnished with vertical and horizontal stops, which automatically reposition projector and eliminate need for resetting after projector has been tilted or turned around for cleaning or inspection. The RDS 14 is for 300 and 500-watt general service lamps or 500-watt floodlighting lamps. The RDS 18 is for 750 and 1000-watt general service lamps or 1000-watt floodlighting lamps. Each model is furnished with plain, stippled or ribbed, heat resisting glass covers.

#### Fluorescent Lighting Ballast

THE development of a 3-lamp, 40-watt, high power factor ballast for fluorescent lighting has been



announced by the *General Electric*. The new ballast is better adapted to installation in a fixture than two separate ballasts and reduces the amount of wiring required for connections. The ballasts are designed to operate on lighting circuits of 110-125, 199-216, 220-250 and 240-280 volts. Power factor is 90 per cent or above.

#### Explosion-Proof Fluorescent Unit

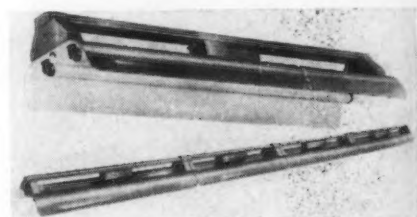
THE APPLETON ELECTRIC CO., 1701-1729 Wellington Avenue, Chicago, has introduced an explosion-proof fluorescent unit. The construction of this unit eliminates the need for sealing fittings and accessories. A terminal block is pro-



vided to make line connection. All factory connections are made to the same block thereby eliminating splices. Easy accessibility to lamps, starters and ballast makes replacement a simple operation. Fixture is furnished with two 48-in. T-12 (40-watt) lamps.

#### Fluorescent Fixtures

A NEW all-purpose Mitchelite line of fluorescent fixtures has been designed by the *Mitchell Mfg. Co.*, 2525 North Clybourn Avenue, Chicago. An easy-fit wireway channel simplifies the problems of wiring and



mounting for continuous rows, and permits locating ballast on the outside. Starters and sockets are easily accessible. The fixtures are available in four models.



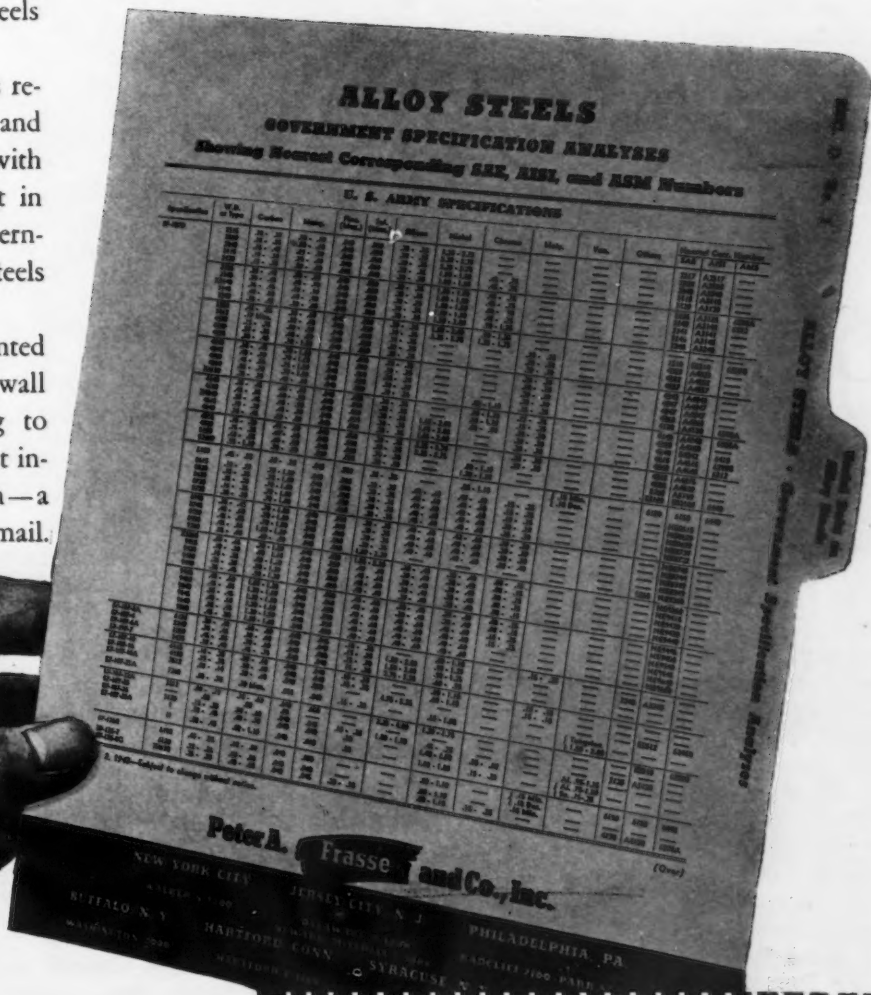
**NEW**

*Revised Frasse Data Chart  
Now Available*

Incorporating all recent corrections and additions, this new Frasse Data Chart enables you to identify latest Government "specs" for alloy steels at a glance.

It shows the chemical analysis requirements for each Army, Navy, and Federal specification, together with its nearest commercial equivalent in SAE, AISI, and AMS numbers. Government "specs" for the new NE steels are included.

The chart is handy file size, printed on tough stock, and suitable for wall or desk use. If you're working to Government "specs", you'll find it invaluable. Just send in the coupon—a copy will be sent to you by return mail.



# Frasse

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SEAMLESS MECHANICAL AND AIRCRAFT TUBING • COLD FINISHED BARS • ALLOY STEELS • AIRCRAFT STEELS  
STAINLESS STEELS AND TUBING • COLD ROLLED STRIP AND SHEETS • WELDED STEEL TUBING • DRILL ROD

• Opening of new Dow magnesium plant calls attention to enlarged output potential . . . No notable progress made on current term aspects of CMP at Detroit meeting.



**D**ETROIT—Production of magnesium has now reached a point where competent authorities figure it is emerging from the critical class. Existing and developing manufacturing installations point to output at the rate of 600,000,000 lb. a year by the end of 1943, which is considered plenty to satisfy aircraft and chemical warfare requirements.

These thoughts are inspired by the first pouring of the light metal at a new Dow Magnesium Corp. plant in Michigan last week. The project, a \$60,000,000 investment of the Defense plant Corp., brings Dow's direct proportion of the total national output to more than a third. In addition, Dow licenses its process to two other companies, so it definitely is the kingpin of the United States magnesium production—which makes it the kingpin of the world in that field.

The Dow people are frankly looking ahead to greatly enlarged post war uses for magnesium. They point out that at its price of 20c. a lb. today it is actually cheaper by bulk than is aluminum at a 15c. price. On a cubic volume basis ordinary steel at 2c. a lb. is equivalent to 5c. worth of magnesium, 5.5c. worth of aluminum, 7.3c. worth of zinc and 13.1c. worth of copper.

The 20c. a lb. price for magnesium prevails before the start of mass output at the new Michigan plant, which is said to be the most efficient of the six which now utilize the Dow system of production. With a minor price

advantage over aluminum at hand now, and with a further price advantage possible, Dow is looking with challenging mien at every application in which aluminum was utilized before the war.

The Dow electrolytic process for producing magnesium has evolved from the expenditure of millions of dollars in research. Out of this has come the parent plant at Midland, Mich., the second Dow Chemical Co. plant at Freeport, Tex., a Dow Magnesium Corp. plant financed by DPC, also in Texas, the new operation in Michigan and two licensee plants, one to the Diamond Alkali Co., at Painesville, O., and the other to the International Mining and Chemical Co., at Austin, Tex.

**T**HE Dow electrolytic system is a commonplace to chemists; for other engineers it may have some amount of interest. Brine is pumped up, either out of the sea, or, in the case of the Michigan applications, from subterranean pools. Sea water contains 0.5 per cent magnesium chloride, Michigan brine up to 10 per cent. It is treated with dolomitic limestone, which has previously been kiln burned to lend it catalytic properties. A strong magnesium chloride solution eventuates and this is dried, the coarse salt residue being termed "cell feed."

This phase of the new Dow facilities is carried in Ludington, Mich., where most satisfactory brine deposits are obtained. A shuttle line of gondola cars moves the cell feed eastward to the magnesium production plant at Merrysville, Mich.

At this latter plant the cell feed is introduced into a battery of electrolytic pots. These oil furnaces heat their content to about 700 deg. C., converting it to a molten state, and the current is then passed through. Magnesium is released and flows toward the front of the cells, where it is hand dipped into molds forming 17 lb. ingots. The metal thus developed is 99.85 per cent pure.

When all the buildings are completed, in the next six weeks, the number of pots in use will be well up in three figures. Approximately 1000 men will be employed at this plant, along with 700 in the western Michigan plant which furnishes cell feed. This operation is the same size as the Texas DPC plant; either one

classifies as the largest magnesium production facility in the world.

Initial pouring in this new Michigan plant is the latest step in a vertical progression on magnesium production. In 1939 output of this light metal was at the rate of 6,000,000 lb. a year. Shortly before Pearl Harbor it had advanced to 42,000,000 lb. a year. Now it stands well above 300,000,000 lb. yearly; and as was said, this will be increased to nearly 600,000,000 lb. by the end of 1943.

**P**ROJECTED United States production of 300,000 tons of this metal is larger than the rest of the world combined. Germany's output is estimated today at 50,000 tons a year, Japan's is 14,000 tons and England's is 36,000 tons. Italy has no magnesium production.

The electrical installation in the new production plant is of considerably more than passing interest. Utilizing more current than an average city of 25,000 inhabitants, the plant's location was determined mainly because of the availability of adequate electricity, something lacking in the western Michigan area where the cell feed is produced. Power lines bring in 120,000 volts of electricity which are reduced to 15,800 volts in transformers and are then brought down to 600 volts in rectifiers. This current is then distributed through the cell line buildings. G.-E. equipment is used throughout.

The bus bars carrying the current are largely of silver. The United States Treasury loaned the DPC approximately 1000 tons of silver, valued at upwards of \$20,000,000, to make the installation possible. It is not the largest such installation in the country but it is very close to the top; it is estimated that there are some 10½ miles of silver bus bars. Conductivity is said to be about equal to that of copper. No less than 37 Treasury guards patrol this plant to keep an eye on the silver hoard.

The eastern Michigan plant is spread over some 30 acres of cleared land and consists of 33 buildings plus a wooden cafeteria. Concrete, brick and wood were largely used by the builders, the Austin Co., as a conservation measure. Other examples of conservation are noted in the use of concrete staves on some of the electrolytic tanks instead of steel. Still under construction is the last major unit of the setup, an alloy plant



# Save MAN-HOURS.. Protect MAN-POWER

## WITH SQUARE D COMBINATION STARTERS

Square D combination starters (disconnect switch and motor starter in one cabinet) save valuable man-hours and material even before they are put in service—and every time inspection or maintenance attention is required thereafter.

With only one device to mount and wire, installation is simpler—takes less than half the time needed to mount separate units. Complete accessibility makes servicing a fast and simple routine.

Safety features protect man-power. Cover interlock makes it impossible to open the combination starter unless the disconnect switch is in the "OFF" position. Switch handle may be padlocked "OFF" for positive protection while machine is being adjusted or repaired.

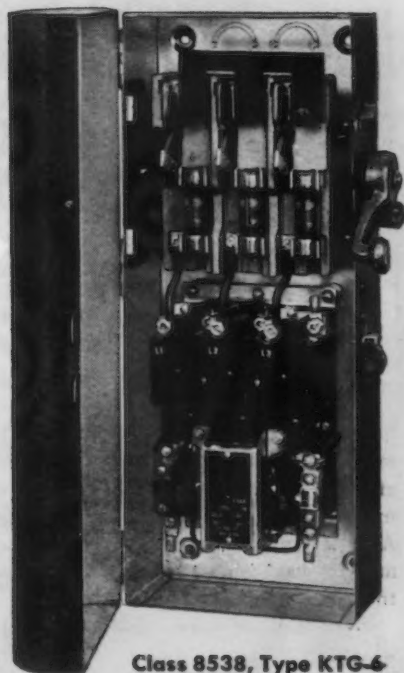
Enclosure steel and wiring materials are conserved because switch and starter are mounted in one box and already wired together.



Model 2K vertical Milwaukee milling machine manufactured by Kearney & Trecker Corporation

Standard Square D safety switches serve as the motor circuit disconnect. Operation is quick make and break. Switch blades are visible for easy inspection. Switch can be operated for testing after cabinet door is opened.

The Square D motor starter has straight line vertical action with double break, trouble-free silver contacts. All renewable parts, including magnet coil and contacts, can be inspected or replaced in a matter of seconds, using only a screwdriver and without disturbing connections or removing the starter from the cabinet.



Class 8538, Type KTG-4 combination starter

## SQUARE D COMPANY

DETROIT - MILWAUKEE - LOS ANGELES  
KOLLSMAN INSTRUMENT DIVISION, ELMHURST, NEW YORK  
IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

### CALL IN A SQUARE D FIELD ENGINEER



If you have a problem which involves electrical distribution or control, call in the nearest Square D Field Engineer. Backing him up in every Square D plant, are design and engineering specialists with complete research and testing laboratories at their command. There are Field Engineers in Square D branch offices in 52 principal United States and Canadian cities.



in which the magnesium ingots will be combined with aluminum and zinc in varying proportions to produce the various Dowmetal formulas.

**A**LPHONSE and Gaston of the comic strips were no more polite than the War Production Board and the Automotive Council for War Production have been after each pow wow on CMP. But the fact remains that the problems of near-term material supply are still unsolved. The discussions are accomplishing a uni-

are not as bad as they seem—there is a lot of undue worry.

Such observations might infer that the CMP attitude is that the defense of the Plan is more important than achieving the Plan's objective of turning out more war materials faster.

The attitude expressed in the press conference gave indication of being a carryover from the closed meetings with the automobile people, who are all but resigned today to the likelihood of curtailments, lost motion and wasted time during the next few

3000 for this larger one, 69 for this smaller one. These must be then collated by specifications, shapes and sizes and orders placed. The organizing of these orders is a fabulous job, taking interminable time and endless patience. Then, several mills may have to be "shopped" before one can be found which can handle the orders, using up more precious time. After the order is finally accepted, the mill must have a reasonable amount of time to schedule the rollings. To meet the indicated needs of the time cycle, third quarter applications should by now be in Washington, but the physical labor of preparing them makes that largely impossible. Not only ought they to be in Washington, it should be added, but the allotments should be back by now. Yet many companies have more second quarter allotments missing today than they have received!

A slender comfort can be drawn from the promise at Detroit that third and fourth quarter allotments would be sent out together in all possible cases. But the dictates of war strategy can be based only generally on planning so far ahead, however much the automotive industry would like to see it. On the face of things it appears reasonable to question the allotments released too far in advance. Cutbacks as have occurred in tank production in recent months would make allotments useless which were released before decisions to curtail were taken.



**FIRST POUR:** A camera-struck worker of Dow Magnesium Corp. took his eyes from his work for an instant while the silvery metal flowed from his dipper into the first mold filled at the new Michigan plant of the company. More nonchalant is Dr. Willard H. Dow as he watches the ceremony of the first pour.

fied viewpoint on improvements to be made over the long term, but their effect cannot be expected to be of much help next month or in June. And the prime worries of the automotive war producers revolve around the second quarter.

Evidence of the difficulty with which progress is made on such problems came indirectly to light in a press conference which was held in Detroit following the WPB-ACWP meetings. Under questioning Harold Boeschstein, director of the CMP division of WPB, indicated that the only way the inherent difficulties of CMP could be cleared up lay in a long-range and gradual approach. Emergency measures cannot be undertaken, he stated. Furthermore, things

months because the fire department isn't immediately interested in their burning house. It now seems to be up to the purchasing departments of the armament makers to put the feats of Houdini and Thurston to shame by bringing steel, rather than rabbits, out of hats.

**T**O illustrate, it is common to find end-products which must be broken down to 5000 components, and it is not rare to find the breakdown spread over 20,000 or more. Applications must go to Washington based on the individual critical material requirements of each of these components. After the allotments come back they must be broken down—perhaps 48 lb. of steel for this small part,

**M**ORE on the optimistic side were the remarks of C. E. Wilson of WPB, who came to Detroit with the CMP officials. Mr. Wilson looked at Willow Run, was pleased at the progress, and predicted that 500 airplanes a month would be coming out of the Ford bomber plant "before the snow flies."

The Ford people, of course, still have to face their employment problem outlined in recent "Assembly Lines." During the past year Ford has trained 19,618 persons, of which 11,061 have left their jobs, about half of them going into the armed services. As a result, the company would like those workers tightly frozen to their jobs at Willow Run, and has discussed such a possibility with government officials. This was followed up last week by an unnamed top official who stated that Willow Run could improve its position vastly if it could obtain a freeze of about 20 per cent of its skilled labor, including supervisory personnel and others in bottleneck factory posts.

# How to "Trouble Shoot" Tool Failures



The term "trouble shooting" has been aptly applied to the business of trying to find out why something went wrong. A good trouble shooter must be open minded and unprejudiced. He cannot first make up his mind what he "hopes" the trouble is—and then set out to prove he is right. Furthermore, he must be well informed on his subject. Discussed below are a few tips on tool trouble shooting that may be of help in your tool room.

**Spalling in Service**—Tools like header dies, coining dies, striking dies and embossing dies which are under heavy pressure must usually be made from a surface hardening tool steel. If they are made from a tool steel that hardens clear through, they are likely to split—they need the reinforcement of a tough core in order to hold together. If the hardened case is too shallow for the pressures involved, it will cave in like thin ice. This sinking action frequently progresses slowly—but eventually a chip will come loose and this is known as spalling. An example is shown in Figure 1.



FIG. 1

The remedy for this is to use a higher hardening heat, or a flush quench, or both, to drive the hardness penetration deeper. Failing in this, use a steel having slightly deeper hardening characteristics.

**Heat Checks**—In the red-hard tool steels used for hot forming operations, the working surface of the tool will frequently become crazed with a pattern that is suggestive of grinding checks. When a tool is in contact with the heated work, it is suddenly heated. If a liquid coolant is used, the minute the hot forging is removed the surface is rapidly chilled. This process is repeated many times and finally the surface starts to heat check. A badly checked hot drawing mandrel is shown in Figure 2.



FIG. 2

Heat checking can be greatly helped by not employing so violent a coolant. A stream of water can be replaced by an air blast. Also, a tool that has been drawn back far enough to have some ductility will resist heat checking better than a harder tool.

These tips on trouble shooting were extracted from "Tool Steel Simplified". They are just part of one chapter of the book. Put all the useful facts on many subjects in this book to work for you—right in your tool room. Order copies for the tool room men you want to train—for your "trouble shooters"—today.

THE CARPENTER STEEL COMPANY, 121 BERN STREET, READING, PA.

**Grinding Checks**—Grinding checks so fine that they cannot be seen with the naked eye can so weaken a tool that it may later fail in service. Figure 3 shows a tool with grinding checks that has been boiled in acid to make them visible. If this tool were to fail as a result of grinding checks, the edge of the fracture would follow the path of some of the checks. This makes a characteristic jagged edge to the fracture which should immediately suggest grinding checks. Boiling the tool in acid will make them visible.



FIG. 3

Obviously, all grinding checks are not the fault of the grinder. If he receives a poorly hardened and poorly drawn tool that is almost ready to fall apart when he gets it, he cannot grind it successfully, no matter how careful he may be. On the other hand, it is so easy to hog into the work on the roughing cuts that many good tools are ruined in grinding.

**Machining**—It is well to be suspicious of tools from which large amounts of metal have been cut, and those that have deep, sharp stamp marks. In case of doubt, it is better to be on the safe side and give such tools a strain relieving anneal before hardening them. Figure 4 shows a pneumatic chisel that failed in service from fatigue that started in a deep stamp mark.



FIG. 4



## "TOOL STEEL SIMPLIFIED"

315 pages, 105 illustrations. Available at cost in the U. S. A. — \$1.00 a copy (\$3.50 elsewhere).

More than 35,500 copies of "Tool Steel Simplified" are now being used in plants like yours to train new men, "up-grade" older hands, save time, trouble shoot—get better and faster production.

# Carpenter MATCHED TOOL STEELS



• **Smith Bill favored to halt foremen's unionization . . . Steel industry views organized foremen with alarm . . . CIO's Pressman and Claire Luce dissident.**



**W**ASHINGTON—Authoritative Congressional sources say that the bill to amend the Selective Service Act proposed by Representative Howard Smith (D.—Va.), forbidding the unionization of supervisory employees, will be reported favorably by the House Military Affairs Committee in a modified form. It is said that a majority of the committeemen favor the approval of a bill which will establish a line of demarcation beyond which unions can not go in attempts to organize employees, at least for the duration. Steel company executives have strongly supported the bill, while union leaders have vigorously opposed it.

Lee Pressman, CIO chief counsel, told the committee last week that pas-

sage of the bill would kill the unions. He said that the bill is fascistic, would not provide for the full utilization of manpower but would destroy collective bargaining and trade unions. On the other hand, steel executives pointed out that if Congress does not pass the bill, new organization drives would impede production, lead to industrial chaos and pave the way for the complete socialistic state and the abolition of free enterprise in America.

What caused all of the furore was a recent decision by the National Labor Relations Board in the case of the Union Collieries Coal Co., Oakmount, Pa., which said that supervisory employees of the same level might be unionized. The Wagner Act which controls collective bargaining specifically excludes any employee on the management side, such as foremen, superintendents and office workers, from union organization. Up to now, all CIO and AFL wage and hour contracts have likewise excluded foremen. The Fair Labor Standards Act also excludes employees of this class.

**B**UT AFL, CIO, USW and independent unions have all recently begun organizing drives to include supervisory employees. Joseph Larkin, vice-president of the Bethlehem Steel Co., said that the unions had started drives in California, New York and Maryland at Bethlehem's plants in those states. Mr. Larkin seemed very concerned about the attempted organization of timekeepers at Bethlehem's Staten Island shipyard and

piece work counters at its Sparrows Point, Md., steel plant.

C. R. Barton, vice-president of National Supply Co., Pittsburgh, said that USW has asked NLRB to certify it as the collective bargaining agent for all foremen and supervisors on an hourly wage up to but not including departmental superintendents and excluding all office supervisors at Etna, Pa. E. F. Blank, director of personnel relations at Jones & Laughlin Steel Corp., said that UMW was trying to organize watchmen at J&L's Cleveland Works.

**T**HE following is the testimony of leading executives who support the bill and oppose the organization of supervisory employees:

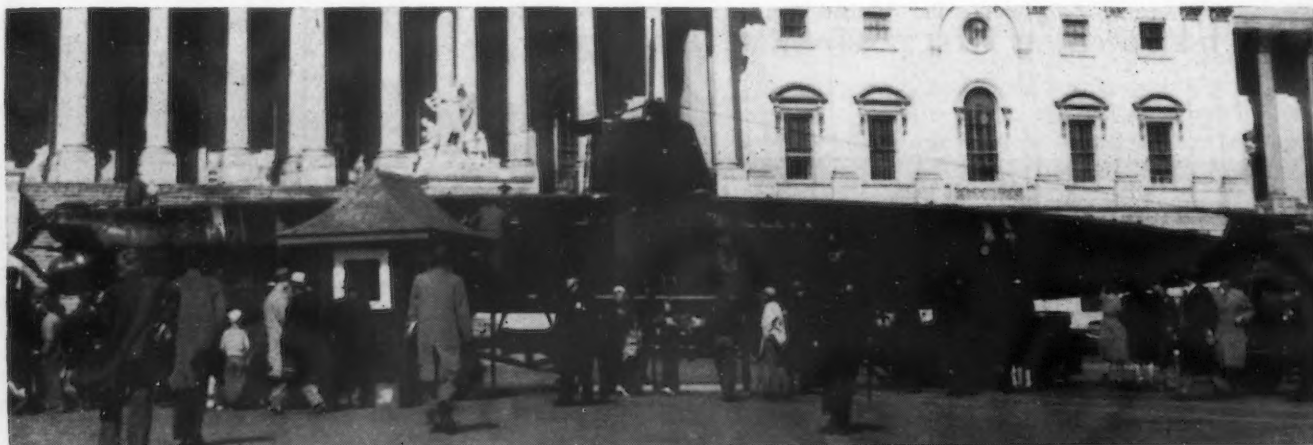
J. A. Voss, director of industrial relations, Republic Steel Corp.: "I have often said throughout the years, take away from us our foremen and we are lost because they are the people, especially in the steel industry, that have got to be held responsible for production, for cost, for accident prevention and for all the various phases of the business. They are the representatives of management out there on the firing line."

Mr. Larkin: "The man in the ranks is hired and instructed in his duties by the foreman. The foreman is his boss, and that is how he regards him. That is traditional set up. Foremen and their assistants, timekeepers, counters and men with similar responsibilities, have always been looked upon and rightly as a part of management.

"The foreman is a first line officer

**JAP AID TO BOND SALES:** A two-man Jap submarine captured the day it struck at Pearl Harbor is exhibited on the Capitol plaza to help swell Washington's quota of war bonds.

Harris & Ewing





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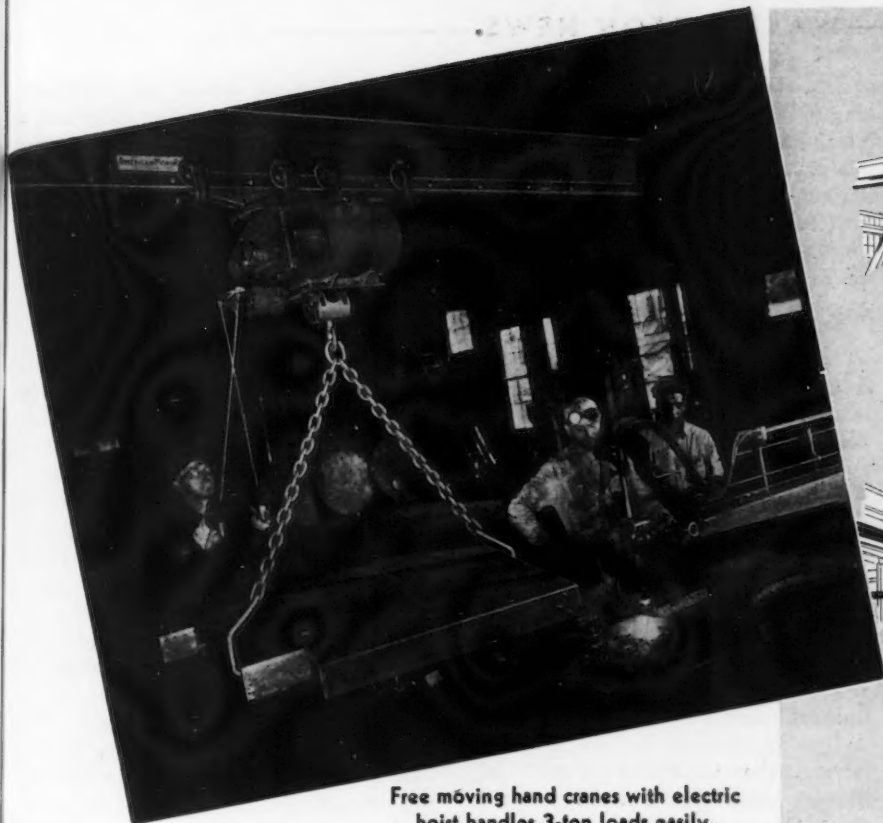
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Free moving hand cranes with electric hoist handles 3-ton loads easily.

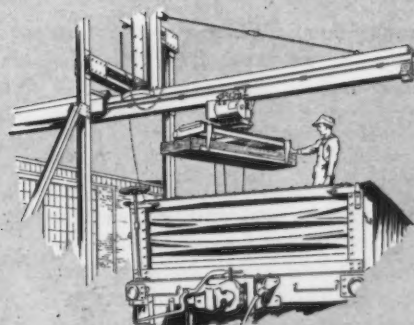
## FOR THE DURATION AND LONG AFTERWARDS

*American MonoRail Equipment offers versatile application without costly adjustment or lengthy engineering.*

**Y**OU can better your production NOW—later in the post-war period you will have essential equipment available for changes in product or process.

American MonoRail handling equipment is extremely flexible. Standard parts fit quickly and easily into complete systems that solve a wide range of handling problems.

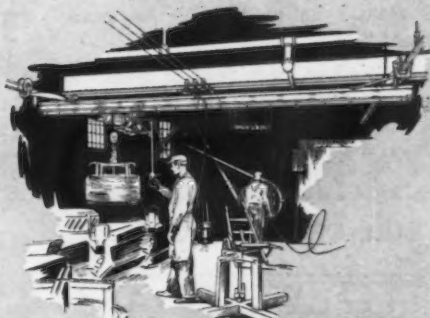
Don't let your handling problems impede your war work. Let our engineers show you how to speed up NOW with an eye on easy, inexpensive adjustment when Victory is ours.



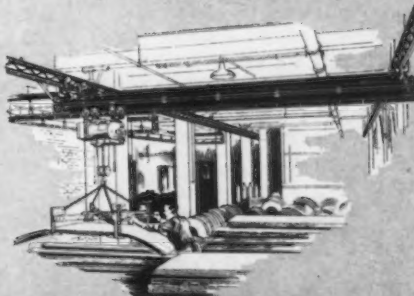
Unloading crane ties in with plant storage area.



Racks handle finished parts through drying ovens.



Stripping crane speeds up removal of wire coils.



Crane over storage area moves steel easily.

# THE AMERICAN MONORAIL CO.

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WRITE FOR Blue Book  
illustrating hundreds of  
MonoRail installations.

of management. When a worker has a grievance, he takes it first to the foreman and it is one of the fore-

*Additional comment on the foreman problem will be found in this issue on page 83.*

man's duties to deal with grievances. The greater the foreman's skill in handling such matters, the more harmonious will be the spirit in that department and the larger the output.

"Now let's suppose that this bill is not passed by Congress and as a result there is nothing to prevent the foremen from joining any labor organization. Then you will have a situation in which the foreman, always heretofore and rightfully considered a part of management, and representing management in dealing with his men, will have a divided allegiance that will absolutely prevent him from continuing to fulfill his responsibilities. Then what happens? It is fundamental that when you have men doing certain work there must be someone to direct them, and it is equally fundamental, I think, that this man should be responsible to management."

A. E. Walker, president of National Supply Co., "Whether the foreman is a member of the same union as the men whom he directs or of a different

union, the result will be industrial chaos. There will be a break down of discipline in the plant, a division of allegiance and responsibility, and the higher management of the company will be unable to carry out the policies, or discharge its obligations because its most effective instrument has been taken from its hands."

MR. LARKIN said that manpower is the one universal factor that affects the production of everything being made for the war effort and that manpower cannot be used with effectiveness if foremen are unionized. He declared he thought that the passage of the Smith Bill would remove the brakes preventing the full utilization of manpower.

Mr. Blank testified that the prospect of unionization of J&L's employees "terrifies us with its potentialities," and averred that the unionization of foremen is "the first step toward the socialistic state." Mr. Blank's point was that organization drives should stop for the duration.

THE attitude of committee members toward the men from the steel industry was very favorable. It was Chairman Andrew J. May, Democrat of Kentucky, who declared that there must be established a point be-

yond which no union can organize. The purpose would be to establish a point where management ends and employees begin, so that collective bargaining principles may be preserved. Forest A. Harness, Republican of Indiana, said that the unionization of management employees, if entirely accomplished, would lead to the complete socialization of the United States through the abolition of management as it is now constituted. E. C. Gathings, Democrat of Arkansas, expressed his sympathy wholeheartedly, with Mr. Blank's position and said, "We have come to a pretty serious point in the country when it is necessary for him to come here and beg and plead for the very existence of his company and the continuance of free enterprise in this country." Paul Stewart, Democrat of Oklahoma, apparently agreed with Representative Harness on his idea that management unionization "would make the industry of the country operate on the same theory as state socialism," and indicated through his questioning that he believes that union organizing drives would detrimentally affect war production.

CONGRESSWOMAN Claire Booth Luce, of Connecticut, expressed a dissident view when she said: "However undesirable it might be in this time of total war to organize foremen, I do not for a second believe personally that to do so would be the end of the free enterprise system."

Mr. Pressman sagely advised the committee that this whole matter should be left to NLRB and he must have had his tongue in his cheek. NLRB has already shown what it will do about the matter and has done in the Union Collieries case.

Mr. Pressman asked the following questions: "Why, when labor is so occupied trying to make its greatest contribution toward winning the war because it understands the issues involved probably more than any other group in our society, do we have all this harrying and attacks? Does anyone believe that through such procedure they are making a contribution toward the war?"

Mr. Pressman did not do so well in answering questions, however. He practically refused to answer committee members who repeatedly asked him if CIO was going to try to get new contracts with the steel industry embodying a clause permitting the organization of foremen's unions.

## THE BULL OF THE WOODS

BY J. R. WILLIAMS







## PRAISE THE LORD — the Ammunition's PERFECT

Every shell hits its mark, smashing the enemy and his installations. Such accurate fire is possible only when the ammunition is correctly and uniformly made; otherwise, some shells would fall short, others over-reach the target or fail to explode. • Each shell body, shell case and fuse mechanism together have more than a score of critical dimensions. To assure uniformity, all dimensions must be checked and double checked with gages and precision gaging instruments. • Uniform ammunition, made uniform by proper Dimensional Control, assures *protective* firepower for our troops and destruction for the enemy.

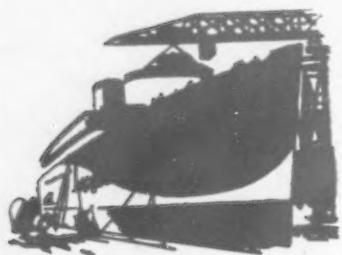
Sheffield specialists in Dimensional Control perfected the MULTICHEK precision gaging instrument to simultaneously check all critical dimensions of shell cases, bodies and fuse parts, in one quick operation. One hundred per cent inspection is now both feasible and economical.

**THE SHEFFIELD**  
**CORPORATION**  
DAYTON, OHIO, U.S.A.  
Specialists in Dimensional Control





• OPA badgers Coast scrap dealers ... Kaiser plans 200 m.p.h. flying wing to bomb Japan ... Portland shipyard vindicated by new tanker contract ... Los Angeles gets tube mill.



**S**EATTLE—Last week was “Stick-Out-Your-Neck Week” on the West Coast. This event has long been popular here, and some of the natives even make it a year-long affair. If you make good, you generally get a lot of space in print; if the axe falls, you get a lot of space in print anyhow. But the real pay-off comes later.

Although measurements were by no means final, the Adam’s apple of the OPA was out in front by at least a split hair at the end of the week. In the Pacific Northwest alone, 16 cases based on violations of OPA iron and steel scrap regulations were pending, three of them against consumers. Some of these may have been heard by the time this reaches print, and the balance are on the calendar for the next week. In nearly every case, the charges involve failure to keep as complete recorders as required by the regulations; some allege allowances and charges on the basis of gross tons instead of net tons. Even granting “guilt,” the violations have been technical and without profit to the scrap dealers.

The effect in the Pacific Northwest has been paralysis in the scrap trade. Dealers refuse to process material, holding they cannot operate without technically violating the maximum price regulation as it now stands, because of freight and differential complications peculiar to this section. It all adds up to a seller’s strike, with the scrap trade at a standstill in Portland and Seattle.

This paralysis has not yet crept down to the warmer sections of the West Coast, where parallel actions are pending in northern and southern California. Southern California is always a plus area and shipments continue into the northern part of the state.

The now embattled waste material trade gives ample additional evidence that this seaboard is correctly designated as part of the combat zone. Charges date back before Oct. 1, 1942, when OPA accusations of technical violations first were filed. Ever since, the members of the trade have refused to sign consent decrees, and the OPA attorney who has insisted on carrying on these cases has finally sought court injunctions. As previously reported in *THE IRON AGE* (April 1, 1943, page 148) Berg Metals Corp., leading southern California scrap firm bit back and asked an injunction against the OPA charging issuance of conflicting regulations which have required the company to fill 96,000 documents to record 6,000 transactions during the past year. It now seems generally assumed that OPA will do some neat footwork—backwards,—to gain time. All of the cases are being reviewed at Washington, D. C., reportedly under the personal direction of Prentiss Brown. The Institute of Scrap Iron & Steel, Inc., has sent its chief counsel to the Coast in the belief that these “smear” cases will show the industry’s inability to operate if there is to be technical insistence on tape-measure compliance with every feature of price schedule No. 4. In fairness to the OPA, it must be said that the legal department appears to be more insistent upon prosecution of these cases than other members of the staff who have had more direct contact with members of the trade. On the part of the trade, there are even hints that certain cases represent personal feuds, or are lingering remnants of the crack-down days of Leon Henderson.

**C**ARRYING more weight and thus forced into second position in the neck-sticking-out race was Henry J. Kaiser, who told a Portland audience that he wanted to build a 175,000 lb. “Flying Wing,” largely out of magnesium, and that the first such plane could be built in approximately 15 months with an “infinitesimal”

amount of material. Although the WPB relative scarcity list still puts magnesium near the top, Kaiser said the nation’s supply is rapidly reaching the safe stage. Kaiser’s engineer said the plane, which he “intends to build now while the war is still raging,” will have a wing span of 282 ft. and will be pushed to a speed of 200 miles per hour by the power of four 2,000 h.p. motors. Kaiser said it could fly 17,000 miles without stopping, and, despite the speed, could be used for bombing Tokyo if constructed now.

With Kaiser was his chief aeronautical engineer, O. E. Koppen, on leave from Massachusetts Institute of Technology. Reviewing recent aeronautical developments, Mr. Koppen declared that one by one “the many parasitic parts have been taken off aircraft or improved in shape, or—streamlined. By now we have reached the point of diminishing returns. There is little we can accomplish by minor refinements. The next logical parasite to be removed is the body.”

Kaiser also revealed that the three experimental 125-ton cargo planes now being built by Kaiser-Hughes, authorization for whose construction was born of last summer’s “flying freighter” controversy, are proceeding satisfactorily and that the first will make its trial flight within 12 months. These aircraft are plywood seaplanes.

**O**NE of Kaiser’s earliest neck extensions also gave indisputable proof that it was highly in order last week when the first Gold Eagle award ever presented by the Maritime Commission went to the Oregon Shipbuilding Corp., Portland. The guilded bird will top Oregon’s “M” pennant, signifying that the shipyard has received nine gold star production awards. Each star represents delivery into service of one Liberty ship from each of the yard’s ways in less than 105 days from keel-laying dates. Under the management of Edgar Kaiser, a son, the firm has delivered 154 Liberty ships since the first keel was laid on May 19, 1941.

More typical of run-of-mill entries in the neck-out race was George E. Murphy, of Portland, who told reporters that he had taken options on a 400-acre site for a steel mill at Everett, Washington, for erection of a

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# THE *Awkward* GIANT

Water wheels, built to concentrate natural power, were one of man's early introductions to the powerful forces he is still learning to command. Cumbersome methods of shutting off or diverting the flow of water were used to control application of the wheel's power. It was a long time before the development of suitable devices for making this giant do man's bidding took place.

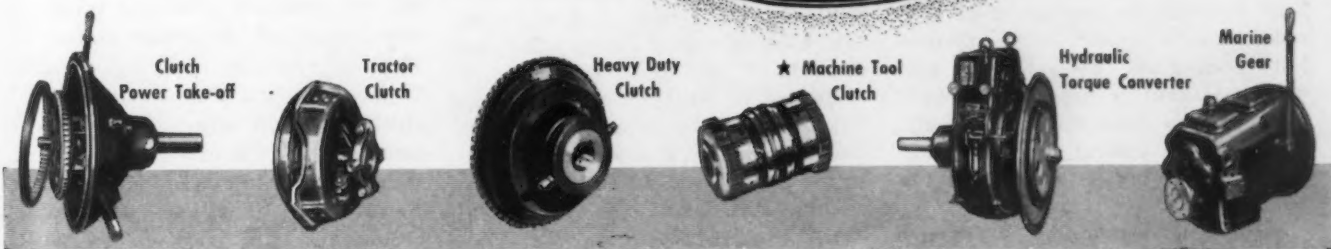
As a matter of fact, when the Twin Disc Clutch Company started in business, 25 years ago, so much still remained to be done in the field of coupling driving and driven units that we have concerned ourselves solely with the design and manufacture of industrial clutches ever since. Today, Twin Disc Clutches improve the performance of power driven equipment ranging all the way from fine machine tools to rugged earth moving machinery.

Tomorrow—after the job we are all doing now is finished—precise control and maximum utilization of power applied to loads will be of utmost importance. To help forward-looking manufacturers make the most of new ideas, the Twin Disc Clutch Company offers today—now, while new designs are being planned—the expert advice and counsel of its skilled engineers.

Reliable clutch performance is obtained only by careful consideration of every factor of speed, load and service conditions, with clutches chosen to meet the needs of the job. A quarter century's experience in application engineering as well as manufacturing . . . and a broad, varied line of standard clutches . . . are at your service here. Consult us on your clutch problems now, as you plan the products you will make tomorrow. TWIN DISC CLUTCH COMPANY, 1402 Racine Street, Racine, Wisconsin.



*Twin Disc Machine Tool Clutches★ add easy operation and single point adjustment to compactness, high torque capacity and long wear life to stay ahead of every demand made of them by modern high speed production.*





\$24,000,000 steel plant—if WPB approved. He talked of yearly output of 170,000 tons of pig iron, 200,000 tons of steel ingots, 75,000 tons of structural steel and plates and 60,000 tons of merchant bars. Iron ore, he declared, was available within 40 miles of Everett. His suggestion was classed a "dark horse" entry, typical of many in the past, and drew long odds.

steel warehouse stocks are gaining gradually, but are still unbalanced. Serious shortages still exist in many bar items. Trade members feel that the San Francisco Bay joint inventory will, after a short period of operation, prove that in some instances base quota tonnages have been too low, and that justification will then exist for increasing allotments to remedy the situation.

**SEA STINGER:** Shown here with a miniature PT boat modeled by a former Packard marine engine worker now in service, Lt. Commander Alan R. Montgomery (right), discusses with Geo. T. Cristopher, Packard president and general manager, the deadly effectiveness of the speedy craft.



To prove that the Maritime Commission bares no hard feelings as a result of the splitting up the tanker "Schenectady" built at the yard, Kaiser Co.'s Swan Island shipyard, Portland, received a contract for 47 more tankers of similar design. The new contract will bring to 103 the number of 16,500-ton vessels assigned to the yard and will insure full operations to the end of 1944, according to Edgar F. Kaiser, general manager.

In operation since April 1, San Francisco's WPB-sponsored steel warehouse central inventory, plans for which have previously been described in this column (March 18, 1943), has been receiving an average of 50 calls a day, and 75 per cent of all inquiries have been filled. Recommended procedure is that a prospective buyer first tries his usual source of supply, and calls the central inventory only if his usual supplier cannot fill the order.

Under CMP distribution, West Coast

**C**OLD drawn seamless carbon and alloy tubing for the aircraft industry will be produced in a DPC plant to be erected in the Los Angeles area on an emergency schedule and to be operated by the newly organized Pacific Tube Co. The plant will have its chief wartime utility in filling emergency orders for Coast industry and will be laid out on as flexible a basis as possible. On emergency orders the Coast manufacturers now must wait from 150 to 210 days for delivery from eastern mills, whereas the new plant will make possible 14 to 35 day deliveries, it is hoped. Cold drawn seamless tubing will range from ½-in. o. d. to 4½-in. o. d. Electric welded tubing will range from ½-in. to 2-in. o. d.

Housed in buildings shipped from Texas, and to a great extent with used machinery, production is slated to get under way in 90 days. Announced DPC investment was \$1,750,000.

F. G. Harmon, for 16 years assistant general manager of sales for Columbia Steel Co., U. S. Steel subsidiary, is executive vice-president of the new firm. President is Clarence A. Warden, Sr., of Philadelphia. The plant will be the first of its kind on the Coast.

**W**AGE increases to bring earnings of employees of southern California aircraft parts firms into those created by the airframe industry stabilization agreement have been authorized by the Tenth Regional War Labor Board. The increases, which range from 2c. to 15c. per hour, were made in individual cases of some 60 different parts companies, whose cases had gone separately to the Board, and do not represent any wage and job standardization in the parts industry.

Dr. Theodore Von Karman, director of the Guggenheim Aeronautical Laboratory, California Institute of Technology, Pasadena, declared in a Los Angeles address, that "it can be expected that non-conventional systems of airplanes, like helicopters and tailless airplanes, and non-conventional methods of propulsion, like gas turbines and reactions jets, will be made practical after the war." His address traced the effect of war upon aeronautical research, pointing out the impetus given to aviation by the last war and its decisive influence on the engineering developments of aviation in the post war period. He declared that only in America had aerial transportation on a purely business basis been developed.

## New Group to Speed Recovery of Frozen Steel

New York

••• A drive to speed recovery of frozen steel stocks for use in war production will be undertaken by the Salvagers and Redistributors Association, a group just formed by dealers in the principal steel centers.

The association, with national headquarters at 261 Broadway, New York, will aid members in solving problems growing out of the administration of M-21-b1, which gave official recognition for the first time to the dealers' status, and will help them in cooperating with WPB and the SRC. A. Heinowitz of Eastern Metals Co., Newark, N. J., is president of the group.





**S**KILLED workers are scarce these days. Many machines must be operated by people who do not have the finished dexterity that comes with long training and experience. Machines must be built to demand less of the operator.

Vickers Hydromotive Controls make it possible to build "skill" into the machine. Any desired control sequence may be set up with a Vickers Hydromotive Circuit. Complex operations may be reduced to a simple routine—or may be made automatic. Controls may be interlocked so it is impossible to do the job wrong. Exact load limitations may be applied so the machine cannot be overloaded.

Such machines are safer—give more and better pro-

THE **"SKILL"** IS BUILT  
INTO THE MACHINES WITH

**VICKERS**  
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**CONTROLS**

duction, reduce work spoilage—demand much less skill in the operator.

Discuss "hydraulics" for *your* particular machine with a Vickers Application Engineer.

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for Every Hydraulic Power and Control Function



CONSTANT DELIVERY  
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CONTROL  
ASSEMBLIES



FLUID  
MOTORS



VARIABLE DELIVERY  
PUMPS



DIRECTIONAL  
CONTROLS



PRESSURE  
CONTROLS



VOLUME  
CONTROLS

# Fatigue Cracks

BY A. H. DIX

## They'd Rather Look Than Listen

• • • As one who has never been able to learn a game or assemble anything from printed instructions, we are delighted to discover that an aircraft manufacturer finds deafmutes make better instructors than do the agile tongue and tonsil boys.

It seems that the power of speech, instead of being an aid in teaching certain operations, is actually a handicap. The beginners get the idea faster by looking than by listening, and as deafmutes think wholly in gestures, they make perfect visual instructors.

But even though an ounce of demonstration is worth a ton of explanation, there are times when printed instructions must pinch hit for a demonstrator, as for instance the other night when we lugged home our air raid warden's stirrup pump, unassembled. With it was nary a word of advice on how to put it together. In a half hour we found out all the wrong ways, and it was a full 45 minutes before we could make it squirt water.

At that we were doubtless ahead of the game. If we had had printed instructions to help us, it would probably have taken us an hour and a half.

## He Dreamed He Drowned

• • • One of the editors came back from a long trip with a story about an industrialist who is fonder than the average of publicity. He dreamed he was in a yacht, and the yacht was torpedoed. He was thrown a lifeline and a headline. You can take over from there.

## J. Elwood Doakes, Well-Known . . .

• • • Which makes us wonder at what stage in his career a manufacturer begins to rate the august title "industrialist." What are the qualifications and how does the news get around that he has been knighted?

## No-Light-Hider-Under-Bushel He

• • • Speaking of superiority complexes, we heard that a gentleman who does rate rather high in his quite specialized field recently began a talk thus:

"Three of the greatest minds in the country on the subject of . . . were seated around a table recently. I said to the other two . . ."

## Sorry, Doug

• • • Last week's poem about the monk from Emporia ("Somervell was surprised as hell") got through without a credit line to the author. It was written by Doug (Lindberg Engineering Co.) Rader, to whom we sincerely apologize.

## Our Little 5 Million C.P. Candle

• • • A little candle we lit on March 25, with the news story, "30,000 Unemployed and 7,000 Empty Houses in Scranton, Neglected City," is throwing its beams far, and has in fact started a nation-wide blaze. Newspapers all over the country have picked it up. The big metropolitan dailies are basing long editorials on it. It may soon bloom in one of the major multi-million circulation national magazines.

In our story we quoted Senator Joe Guffey's secretary, R. H. Bailey, Jr., as telling our reporter:

"Anyway, those anthracite regions, that area around Scranton, why they've been going back for years. What if they did get some war plants? It wouldn't help."

The Associated Press asked Mr. Bailey to develop his views further on this subject. But not only would he not accede, but gave the impression that they had been developed too much already. In fact, he declared that we were guilty of "a gross misstatement" in quoting him as above. He said he never said it, but Miss Jane

Butzner, of the brains department, who wrote the story, has it right down in shorthand.

The point of the story is that, with labor at a premium, it would seem sensible to locate new plants, especially plants built with government money, in Scranton or in another of the 81 industrial areas where unemployment exists and where there is a surplus of housing facilities. Now that the situation has been exposed, we hear that Scranton has excellent prospects of getting what it should have had before. But we are naive enough to be shocked by Washington's "don't-look-now-but-there's-a-labor-surplus-in. . ." attitude.

## Stopper

• • • For 8 years I slept in the print room—Ozalid.

## Millimetric Shortcut

You said recently, "We have accustomed ourself to divide by 25 when converting millimeters into inches. I always multiply by four and point off two places, thus a 155 mm. gun is 6.20 inches.

—W. J. Hamilton, Secretary,  
Hendrick Mfg. Co., Carbondale, Pa.

Mr. Hamilton's conversion method is simpler, and we have changed to it. Incidentally, we didn't know until the other day that while the Army uses the metric system, the Navy still sticks to inches. You would think this would be a bomb crater in the path of co-operation.

It makes us think of the time when a downtown newspaper editor sent a cub reporter out to City Hall Park to measure the depth of a snowfall. The reporter grabbed a pica rule by mistake (6 picas to the inch), came back and said, "It didn't look that deep to me, but here it is, 18 inches."

## Tall, Stunted

. . . the device makes it possible to make deep, shallow cuts in a planer or shaper.

—The Iron Age

Run by a fat, emaciated operator?

## Up and Down, Stan, Not Crossways

Cold-weather operation of . . . trucks is problem enough in the middle-northern belt which includes New York, Boston, Detroit, Chicago and other cities in that longitude.

—Assembly Line, The Iron Age, Apr. 1

What you mean, Stan, is in the same latitude, like Ottawa, Pittsburgh, Havana, Quito, and Cape Horn.

## Something Appetizing on the Fire

• • • While snooping around the brains department the other day we discovered that the master minds are working on a big chart longer than your arm, that will enable you to match up, in a matter of seconds, any SAE or AISI steel and its opposite NE number. The chart gives comparable analyses, and has a special surprise feature which will endear it to your heart.

It will be a part of an early issue of your favorite family journal, and we are willing to gamble that the day after it is out it will be a more popular wall ornament in the industry than calendars are.

## Puzzles

Last week's cards should be arranged 3, 8, 7, 1, Q, 6, 4, 2, J, K, 10, 9, 5.

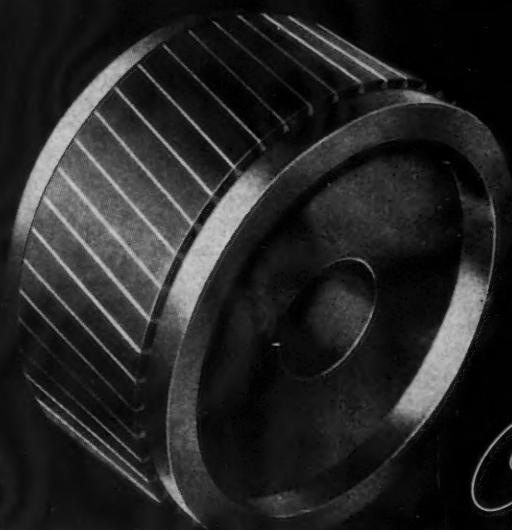
The April 1 Bren gun fires 300 rounds per min., so there are 299 intervals between explosions. Each interval is .20068 sec. In 5 seconds there are 24.915 intervals. Therefore, 24 rounds are fired in 5 seconds.

A two-minute solution to this one entitles you to a seat in the front row:

A hungry hunter encountered two tramps, one of whom had 3 loaves of bread and the other 5 loaves. All loaves were of the same size. The loaves were divided equally among all three, and the hunter paid 80c. for his share. How should the tramps divide the money?



# You don't need Extra Size



## With this Extra Quality

*Copperspun*

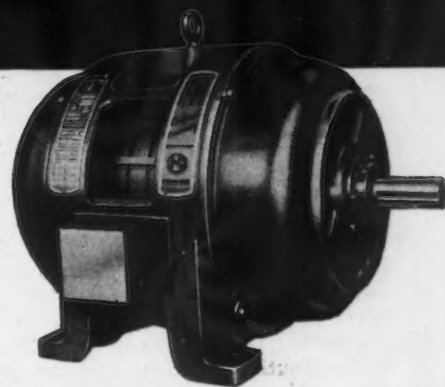
• No need to tell you that wartime restrictions make it impossible for you to get extra-size or extra-horsepower motors for any job that calls for specific horsepower.

But don't let that worry you for a single moment. Put Fairbanks-Morse Motors with Copperspun Rotors on the job—and you *do not need* extra horsepower or extra size.

The reason, briefly stated, is this: The winding of the F-M Copper-

spun Rotor is centrifugally cast, in *one piece*, of pure *copper*. No other rotor is cast of *copper*. Copper has better thermal characteristics. Copper has better electrical characteristics. For these reasons, you can run a Fairbanks-Morse Motor with Copperspun Rotor *under full load indefinitely* without danger of damage through overload.

Naturally you'd rather not buy horsepower you don't need — if



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GENERATORS  
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WATER SYSTEMS  
FARM EQUIPMENT  
STOKERS  
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RAILROAD EQUIPMENT



# Motors



# Dear Editor:

## RAIDER KNIVES FOR MARINES

Sir:

Long before this you have probably heard a great deal on the subject of knives in the South Pacific; and will undoubtedly hear more. I returned from the South Pacific several weeks ago and know how earnestly every fighting man there wants some sort of a sheath knife. On Guadalcanal such a weapon was more than a necessity—it was a dire necessity!

I understand, of course, that there are restrictions and that it is difficult to give every man the weapon he thinks he should have. None-the-less, can you suggest any way in which Raider knives similar to my enclosed drawing can be legally produced—under current priority restrictions—and made available to the men in our armed forces?

One organization here suggested that a number of firms be approached for funds to pay for the knives, but the donation idea is not so hot. Our men in the South Pacific do not ask for gifts, and are very willing to pay for what they get. If the regulations do not include a sheath knife, then they want to buy them.

Can you suggest any firm which could make these knives? I believe that if these knives can be produced I could be of real assistance in helping the people who make them get the knives to the men in the South Pacific. Nothing would please me more than to be able to buy a few dozen now and send them to some of my friends who are still in the South Pacific.

*Los Angeles, Calif.*  
Captain, USMCR

• We understand that many of the cutlery plants are now making knives for the Marines, and that these are issued to jungle fighters. Several campaigns have been conducted in the West to obtain contributions of hunting knives from civilians for soldiers in the Southern Pacific. But can civilians ship packages to the armed forces outside of this country?—Ed.

## CARTOON ENLARGEMENT

Sir:

We are very much interested in your magazine and are particularly impressed with the cartoon, "Out Our Way," which appears in the March 25 issue.

We would like very much to have two copies of this cartoon (preferably 8½ x 11 or larger). Can you tell us how to start proceedings in that direction?

*C. E. ALLISON*  
Lewis Welding & Engineering Corp.,  
Bedford, Ohio

• We buy the publishing rights to the Williams' cartoon series from the NEA Service, Inc., 1200 West 3rd St.,

Cleveland. NEA would probably not object to your making a few photo-static enlargements and suggest that you make the request direct.—Ed.

## TANKER WELDING

Sir:

I was very much interested in the discussion in the Mar. 18 issue regarding the crack-up of the tanker Schemmady.

Having had quite a bit of experience in welding smaller plates where locked-up stresses occurred by unequal expansion due to the application of heat, I believe the condition might be improved by laying the deck plates crosswise of the vessel and start welding in the center working toward the ends, with plates being free to expand and contract until after the deck floor was finished, then tying the deck to the shell with a tube, allowing enough room between the edge of the deck for a two or three inch tube. Of course there would have to be two welds instead of one, but the tube would act as an expansion joint. A similar effect could also be had by using a Z bar hatch section. I believe this would give the same effect as putting a wrinkle in the deck as suggested by Mr. Lincoln, and possibly be more out of the way.

If I can be of assistance in solving such problems, my services are at your disposal.

*SAMUEL H. KENNEDY*  
S. H. Kennedy Co.,  
P.O. Box 2142,  
Knoxville, Tenn.

## ALLOY TURNINGS

Sir:

Referring to your article on page 106 of the Mar. 25 issue in connection with WPB's order, effective Apr. 1, requiring consumers to use alloy steel turnings in an amount not less than 8 per cent of the total weight of alloy steel ingots and castings produced each month.

If, as you stated therein, 3,000,000 tons a year have been or are being consumed, is this not considerably more than what the above 8 per cent specific requirement would amount to? If so, the order may not accomplish the desired relief; in fact, could even reduce present consumption by those consumers who are using more than 8 per cent and to whom the use of turnings is not preferable.

As your very commendable articles on the non-absorption of such critical or vital scrap have brought out, someone (who? your guess may be better than ours) really must relieve the situation as obtaining now, otherwise a considerable portion of its production will be lost entirely for alloying raw materials to the possible eventual serious embarrassment to our country's war activities.

When one thinks about how our government was willing to spend \$500,000,000 for the recovery of high cost scrap at from \$40 to \$71 a ton versus the infinitesimal cost, relatively speaking, of storing scrap like alloy steel turnings, it is nearly something beyond sane or intelligent comprehension.

To me, at least, a solution is quite simple—the consumers absorbing such scrap, storing it, as most of them can very conveniently do, for consumption later, even at government expense if necessary, or Metals Reserve storing it at logical distribution points like they are already doing with many other commodities, some admittedly of much lesser importance.

Further irony: Consumers may not buy certain alloy turnings like those containing low moly, i. e., from 0.15 per cent to 0.65 per cent, where sellers are willing to waive the \$2 a ton premium for the moly, because under WPB limitation orders they cannot use such scrap for making ordinary steel and can only use it for reproducing moly or other alloy steels.

There has been considerable publicity emanating from Washington about "short" turnings whereas the truth is even such turnings are not freely or readily salable. We have even heard of people crushing long turnings and being unable to dispose of them after going to this trouble and expense.

As you doubtless know, this situation has obtained for several months now, with the situation getting worse instead of better, and efforts to find a solution are resulting only in increased correspondence files.

• The writer of this letter, who has asked that his name be withheld, is a mid-western dealer in iron and steel.—Ed.

## CUTTING TOOL LIFE

Sir:

I am employed at the Charleston Navy Yard as a machinist in charge of all single-point cutting and turning tools. A copy of your pamphlet, "How to Increase Cutting Tool Life," was given to me and I got a lot of valuable information from studying it. If you have any more booklets like this, or if you publish them at certain intervals, I would like to be put on your mailing list. They will be very useful to me in the job that I have now.

*C. L. MILLER*  
401 King,  
Charleston, S. C.

• Whenever there is a particularly heavy demand for a certain article or series, we reprint it in booklet form, but the only way of seeing all the articles in THE IRON AGE is to read it each week. The Charleston Navy Yard subscribes and we suggest that you endeavor to obtain access to copies there or at the Charleston Public Library.—Ed.

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# This Industrial Week . . .

- Requests for Steel at New High
- Neglected Industries at Danger Point
- Freight Rate Boost Rescinded
- Ingot Output Takes a Dip

**H**OW to supply steel quickly for several long-neglected but vital industries is being given urgent consideration, spurred by the realization that danger points are near. The task is not easy. Requests by the 14 government Claimant Agencies for carbon steel for third quarter delivery have reached a high mark about 20 per cent greater than the tonnage sought for second quarter. All agencies declare their needs are paramount.

The oil industry and the railroads are two of the industries whose need for steel is becoming more critical rapidly. Then, there are many urgent demands in other fields, plus tight spots in the war program, like difficulty in obtaining steel for anti-friction bearings. Meanwhile, steel has been lost recently through labor disputes. The Edgar Thompson plant of Carnegie-Illinois Steel Corp. lost about 3000 tons of steel and 2000 tons of iron last week when the plant was forced to shut down for one shift due to a grievance over transferring time-takers to other vocations. A strike at Gary which lasted for 24 hr. early this week resulted in the loss of enough steel to produce 150 tanks.

Having completely used up its reserve stocks of casing, tubing, drill pipe and other goods, which amounted to around 260,000 tons at the end of last year, the oil industry is scratching furiously for steel. Efforts are being made by governmental authorities to supply around 40,000 tons which would be earmarked mostly for wildcatting. In the first quarter of this year, the oil industry was allowed about 140,000 tons of steel but due to the priority situation received no more than about 75,000 tons. Recently, the shortage of material has been so great that approximately 60 per cent of the pipe originally slated for Russia already has been gobbled up, even though much of it included bastard sizes.

**W**EEK by week, the problem of obtaining more rolling stock for the railroads has been becoming more acute, and now frantic efforts are being made at Washington to avert a threatened national disaster

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## Republic Electric Steel Plant Starts

Chicago

• • • One of the largest electric furnace steel plants in the United States started operations early this week when the first steel was tapped at the new Chicago area plant of Republic Steel Corp. Built and operated by Republic for the Defense Plant Corp., the plant is completely integrated, with ore docks and coke ovens at one end and finishing mills at the other. The plant at present is about 50 per cent finished with two electric furnaces in operation. When completed, it will include a blast furnace with annual capacity of 450,000 tons, 75 coke ovens, a sintering plant, four tilting open hearths for supplying hot metal to the electrics, nine 70-ton electric furnaces of the three electrode type, a 44-in. blooming mill, and a 32 and a 36-in. bar mill. The bulk of the plant's output is expected to be forging quality steel. This plant will raise Republic's electric furnace steel capacity to about 1,700,000 tons a year.

caused by faulty WPB estimates last November. The steel industry itself is worried over the outlook for transcontinental transportation.

The situation in regard to locomotives is not so bad, as schedules call for providing 970 for domestic use this year. ODT has requested an additional 30,000 freight cars, raising the 1943 total to 50,000 cars. The first request of the railroads was for 80,000 cars but this was trimmed at Washington. Deliveries of about 60,000 tons of steel were delayed in the first quarter, retarding the car building program eight to ten weeks with the result that nearly 9500 cars scheduled in the first half of this year cannot be built until the third quarter.

The ODT has applied for 2,200,000 tons of steel for the third quarter, including 600,000 tons of rail, 400,000 tons for repair and 350,000 tons for track accessories. The remainder of the steel will go for other transportation needs such as tugs and barges. ODT asked for 1,759,000 tons of steel for second quarter but was cut to 1,240,000 tons.

**W**PB will not approve a steel allotment for 50,000 cars and will cut the rail allotment to about 400,000 tons, it is reported. If 40,000 composite freight cars (partly built of wood) are con-



structed, and 970 locomotives also are built, an estimated 1,027,250 tons of steel will be required.

All of this seems to indicate that it is doubtful if orderly planning in a war such as this can ever be achieved. The pressure for raw material is terrific from all sides. In Congress there is said to be a feeling that limitations enforced in 1942 were too repressive on the civilian economy. Some parts of the war goods program have been cut back and others have been increased. Longer work weeks have been established in some areas, followed by statements that thousands of workers soon may be out of jobs due to changes in the war program scheduling. Some companies under the CMP have more second quarter allotments missing today than they have received, and at the same time are trying to prepare third quarter applications.

THE ICC decision to reduce or remove freight increases will have an effect on all steel consumers as well as steel companies. The increase put into effect about a year ago roughly amounted to about 6 per cent of the freight cost, and the reduction will take it back to where it was. This means that the delivered price of steel on May 15 will be reduced correspondingly. Part of the reduction will accrue to steel companies up to the extent to which they absorbed freight cost in coming into a basing point. The steel consumer, on the other hand, will gain to the extent of his actual freight costs. The steel industry also will gain slightly on the transportation of raw material to its plants for steel making. Actual reductions on the freight cost of steel items are varied and probably will run from \$1.50 a ton to far western points down to 25c. a ton or less on much shorter hauls. The actual reduction

### Kaiser Steel to Flow May 7

Washington

• • • The Kaiser plant at Fontana, Cal., will begin making steel May 7, when the first of a battery of six 185-ton open hearth furnaces starts. It is expected all the units will be in production by mid-June when, on a basis of a two-heat schedule, it is estimated daily output will be 2000 tons.

The blast furnace at Fontana was started late in December. Considerable pig iron for the open hearths has been piled. Starting of the steelworks has been held back, it was reported, due to the delay in delivery of 250-ton ladle cranes.

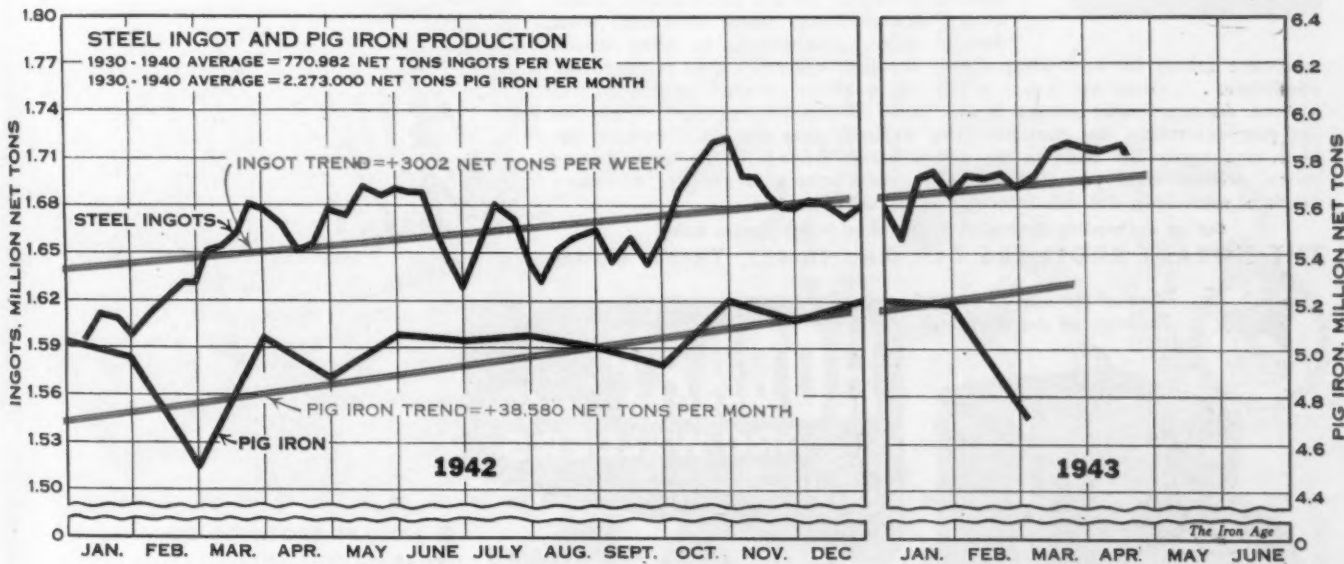
Four of the open hearths will make carbon steel for the alloy finishing mill. The latter plant will be enlarged. An RFC loan of \$21,000,000 was approved on Monday and will be used partially to expand the alloy mill. This loan brings to \$105,000,000 the amount granted by the government for the Kaiser steel plant.

Kaiser interests are said to be seeking plate allocations in anticipation of starting the 110-in. plate mill about Aug. 1.

to all parties involved will of course be only a small per cent of the total price of the materials affected.

THE national steel ingot rate for the week dropped 1½ points to 98.5 per cent, with the Cleveland district down 3½ points to 96, Pittsburgh down 1½ points to 100.5, Southern down 2 points to 100, Youngstown down ½ point to 95, and Southern Ohio River down 7 points to 103. Detroit was up 1 point to 108 per cent, and the Eastern district gained 4 points to 107.5. Chicago, Philadelphia, Buffalo, Wheeling, St. Louis and the West remained the same.

### The Iron Age



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	S.OhioRiver	St. Louis	East	Aggregate
April 8	102.0	100.5	95.5	93.0	99.5	104.5	88.0	102.0	107.0	102.0	110.0	106.5	103.5	100.0
April 15	100.5	100.5	95.0	93.0	96.0	104.5	88.0	100.0	108.0	102.0	103.0	106.5	107.5	98.5

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# Management Analyzes Problems In Ranks of Foremen; Prompt Action Held Necessary

By T. C. CAMPBELL  
Pittsburgh Editor

• • • What are the facts behind the problem which has been developing in the ranks of foremen and other supervisory employees? Management has been inquiring into the matter recently and analyzing various phases of the problem. Some interesting data have been uncovered.

A recent disclosure out of Detroit showed that more than 13,000 foremen in about 20 plants throughout the country, mainly in Detroit, now belong to a foreman's association. Already the Foreman's Association of America, which was organized about a year ago at the Ford Motor Co. has contracts with several companies in Detroit. Membership in this union includes mainly, such plants as Briggs and other important ones, including some General Motors divisions.

Some foremen say that many men in their departments, working large overtime schedules at good premium pay, have been getting more money than the foremen themselves. Theoretically, salary schedules have been built up for foremen and supervisors

*Additional comment on the foreman problem will be found in this issue in the Washington column, page 68.*

which during normal times result in a monthly payment of from 25 to 30 per cent more for the foreman than the top rate in those jobs under this foreman's supervision. During so-called normal times the foreman has made out under such an arrangement, since he has often been kept at full time during periods of slack demand. On the other hand, the wage earner has only worked when work was available. Furthermore, the foreman is said to have certain "privileges" which are supposed to make up for the trials and tribulations which are his everyday affair. In recent years, however, heavy unionization has caused union leaders and grievance committees to by-pass the foreman and go to top management for adjustments. This, in turn, has caused the foreman to suffer slightly in prestige, regardless of the good intentions

involved. Unionization and new deal pressure has also caused top management to spend considerable time on the wage policies for the average workman, thus sidetracking the paramount question of keeping first-line supervision in a healthy state of mind.

A chart with this story indicates the trend in wage and salaried payments. The salary payment index is believed to be a true indication of the

foreman's pay trend, and possibly represents some accumulated factors which have produced the start of organized foremen. The idea that a foreman or supervisor's salary and position is such that in the long run his pay is balanced out against the workman's by the ups and downs of the business cycle probably holds true during most normal times. Since August, 1939, however, a war period set in which washed out all normal factors.

Not singling out the steel industry,

## Action on the Home Front

By FITZGERALD



it is nevertheless interesting to note that in 1941 average wage payments per month per man ranged from 30 per cent to 49 per cent above the average month of 1936, while salary payments per month per man ranged from 8 to 14 per cent. By the end of 1942, average monthly wages were running in excess of 64 per cent above 1936, while salaries were about 15 to 16 per cent above that level. Isolated cases of higher salaries during December for various years is indicated, which is due to year-end bonuses, but which if spread over the years would have little effect on the monthly index.

The typical interview which THE IRON AGE has had with several fore-



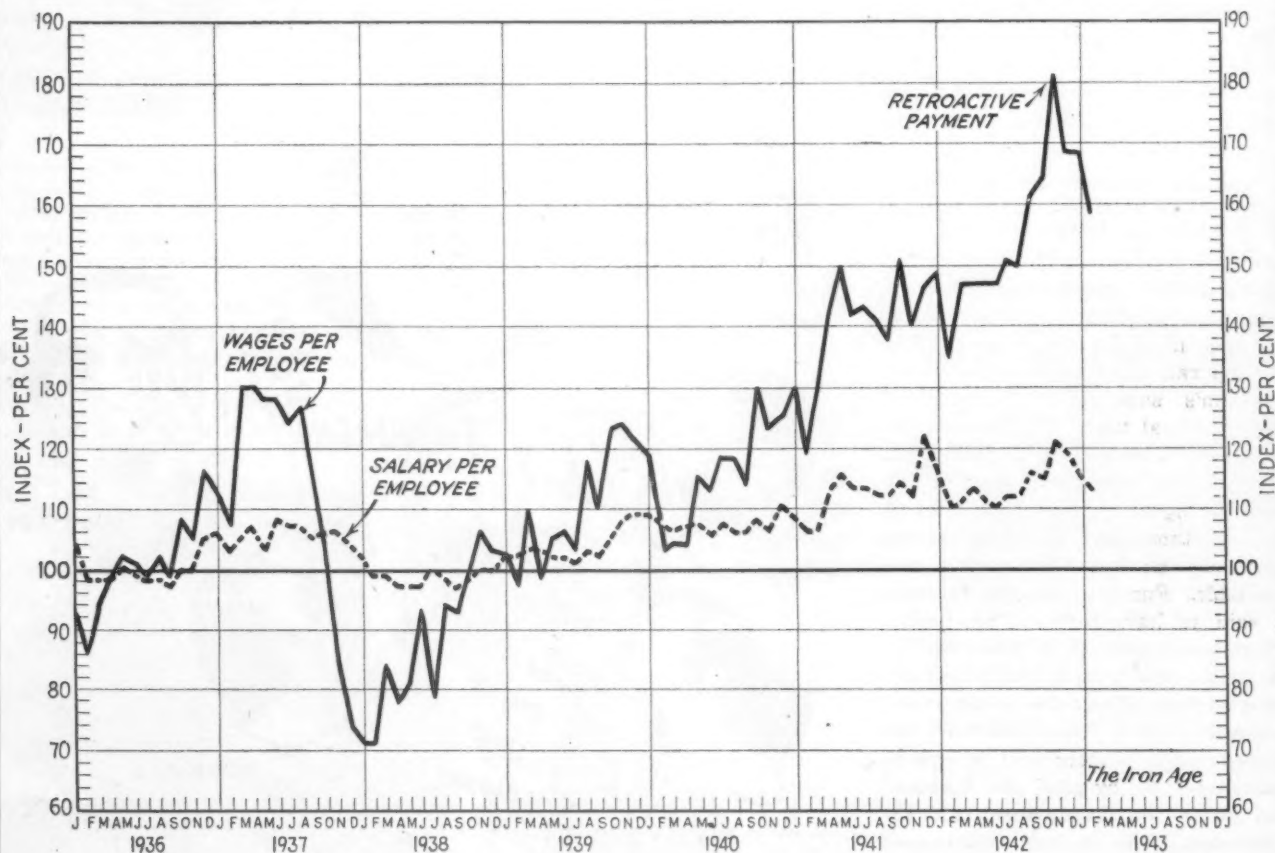
men in various industries would run somewhat as follows: "I ain't kicking about management, and I don't believe in organization for foremen. But where do we come in on this thing. We have a salary based on a 40-hr. or 48-hr. week, but have to stick with our crews, who often work 48 to 55

hours. They get overtime, and we get nothing, and our living costs have gone up just as much as theirs. While we don't want to join any union, it is pretty hard to stand by and see everybody get something but us." While various foremen have expressed their opinion in different ways, the above represents a composite. Another sidelight on the foreman's question is that many of them are quitting their foreman's job to take wage earners jobs.

On the other hand, management has had its difficult problems involving supervisory salaries, but there seems to be ample evidence on the basis of interviews for THE IRON AGE with executives that management over the

••• Monthly wage payments per employee in the steel industry have climbed to about 65 per cent or more above the average month in 1936. On the other hand, salaries per employee per month have advanced about 16 per cent above the average monthly payment in 1936. The indexes are based on actual payments per month and some of the variations are due to more or less paydays in the month as far as wages are concerned. It is believed that a trend line on the foreman and supervisory salaries would parallel that shown for salary workers. The most standardized arguments about foreman's pay not fluctuating (upward) as much as the wage earner's money are that he has certain privileges, often is paid during slack

times, represents management in the last analysis, and generally has a much better "berth." As an average year 1936 was taken because hours worked per week during that year were fairly constant and represented a period before the European War and later the United Nations War began to exert an influence. The problem of foreman and supervisory salaries, despite statements to the contrary, is today a very live subject in all industry. Statistically, the index on wage payments should be higher because of dilutions in the average number of wage earners per month. Due to turnover, absenteeism, etc., the average number of employees on the monthly payroll is probably greater than it should be.





## Give Steel to Railroads or Face Desperate Situation, WPB is Warned

### Washington

• • • Steel transportation is in trouble because of a lack of freight cars and locomotives. The railroads are in trouble for a lack of steel to supply the necessary equipment. WPB is in trouble because it guessed wrong in deciding last November that the railroads should receive only enough steel for 20,000 freight cars and 386 locomotives in the first eight months of the year.

This is the opinion of many top officials in WPB, and ODT. It is also shared by many steel and railroad executives. Moreover, steel executives have said recently that unless the railroad program is materially increased within the limits of production capacity for the remainder of the year, the steel industry is in a desperate situation particularly in respect to transcontinental transportation.

The situation (reported serious in an IRON AGE news story March 4, page 97) now threatens to become a national disaster which may be averted by directions in the rest of the year to locomotive builders. During the second quarter locomotive builders have been instructed to build an additional 367 units. This is broken down to 262 steam locomotives, 38 road diesels and 67 diesel switchers. The second-quarter instructions to steam locomotive builders direct them to produce to capacity and they have been told that steel will be made available for this purpose.

It is expected that in the third and fourth quarters material will be provided for an additional 215 diesels. Railroad executives say that the industry could use double the number of diesel units, but that there is a lack of shop capacity. Thus for 1943 it is estimated that there will be provided approximately 970 locomotives for domestic use, as compared to the 629 originally estimated by WPB. These figures represent production goals, inasmuch as military and Lend-Lease must be satisfied before domestic needs are filled. Original ODT and railroad estimates were 900 locomotives.

Deliveries of approximately 60,000 tons of steel were delayed in the first quarter so that the car building program was retarded from eight to ten weeks with the result that nearly 9500 cars scheduled in the first half of the

year cannot be delivered until third quarter.

The blame for the delay is laid at the door of the WPB Transportation and Equipment Division by railroad executives. The Transportation and Equipment Division insisted that each car builder had to take orders for a designated number of cars and could not build more than two kinds. Delay was caused by this, since equipment manufacturers could not place their orders with steel mills until all companies got their order boards even. Some companies had orders for two or three kinds of cars. Some companies had no orders.

Some of the blame for the lack of cars is placed on the railroads themselves, though the burden of the blame is laid on the doorstep of WPB. Railroad executives say that there is use in 1943 for 25,000 cars of composite type approved by WPB. These cars are partly wooden, and the railroad companies have contended that the need for this type of car is limited. On the other hand, these officials say that there is need for 50,000 cars properly constructed. The first request made by the railroads was for 80,000 cars.

Informed sources say that if the needs of transportation require 50,000 freight cars, or 80,000 freight cars there is some dereliction of duty on the part of ODT and WPB for permitting the railroad industry to dictate what it will accept in the way of freight cars if a national transportation breakdown threatens. Or, it is said, WPB should change car design, if the railroads' objections are technically valid and permit the increased production of all steel cars. Railroad men have recently expressed the opinion that the production of additional motive power will partly ease the car shortage because more deliveries can be made in a shorter time if there are more locomotives to haul cars.

If 40,000 of the composite cars are made according to WPB's apparent intention and 970 locomotives are also constructed, an estimated 1,027,250 tons of steel will be required. This is computed by allowing 20 tons of steel per freight car, exclusive of forgings, 300 tons of steel for steam locomotives, and 150 tons of steel for diesels.

ODT has applied for 2,200,000 tons of steel for the third quarter, broken down into 600,000 tons of rail, 400,000 tons for repair and 350,000 tons for

past few years has possibly been too lax or has taken too much for granted with regard to salaried and supervisory problems. Management feels that if the foremen are raised too high under the present temporary war boom, a difficult situation will arise when the workers' wages are reduced by lack of overtime and lack of regular time, due to slack demand. One suggestion on this, however, was that some type of emergency excess pay should have been instituted for foremen sometime ago, with the clear understanding that it represented a war time adjustment. The crux of the foremanship and supervisory salary problem seems to be the demand for too much "understanding" by the foreman on the part of management.

There is no evidence as yet that foremen's organizations will become universal in industry, but the dynamite is there in the form of the suppressed or unspoken opinions to management of every foreman down to the last man, except those, of course, who have been "cared for" either voluntarily or by union contracts.

In recent months, a considerable part of management has been cognizant that "unless the non-commissioned officers in industry are convinced that they are part of management," industry has a tough row to hoe.

Summing up the situation, however, it can be said that management is finally aware that the entire system of private enterprise is jeopardized by the difficult foreman and supervisory problem and that much thought is being given the subject. Realists, however, point out that too much thought and too little action might produce a change in American industry undreamed of a few years ago.

### Relations with Foremen Stressed in Bulletin

#### Chicago

• • • Declaring that some employers have so neglected foremen and supervisors that they have become "orphans of the storm," the National Metal Trades Association has released to its 900 members a specially prepared bulletin "Management's Right Hand—the Foreman," which urges management not to "let these men down." The bulletin was issued by Homer D. Sayre, commissioner.

track accessories. The remainder of the steel will go for other transportation needs such as tugs and barges. ODT is again putting the question squarely up to the WPB Requirements Committee which pared ODT's 1,759,000 tons request for the second quarter to 1,240,000 tons. It is understood ODT has requested steel for 30,000 additional freight cars, raising the 1943 total to 50,000. WPB will not approve, and will cut the rail allotment to about 400,000 tons, it is

reported. The reason is said to be that overall third quarter steel requirements are 20 per cent over supply.

The second quarter allotment only provides 350,000 tons for rails, and 245,000 tons of steel for track accessories, including frogs and switches. There was a prohibition in the allotment against ODT approving any additional freight cars above the 20,000 figure. (See *Truman Committee Statement on page 127.*)

## Effect of ODT Orders Analyzed; New Plans to Speed Car Service Mapped

### New York

• • • The steel industry has worked at 100 per cent of capacity for the past month and a half. The amount of freight moved has skyrocketed to over 638 billion car miles in the past year, 16.5 billion car miles more than in 1941. Obviously, the complexities facing those trying to untangle the transportation snarls are tremendous.

Heavier loading of cars, faster unloading, quicker return of empties, better cleaning of cars by users—these are among the helpful steps already taken, most of them moves well known to the public. Many other plans have been studied, and some of them may be announced within the next few months, as outlined below.

The first ruling, of ODT Order No. 18, affecting steel transportation, has been in force since last November. This deals with heavy loading up to marked or feasible capacity of cars. Since most steel companies do not have too much storage space available, this order has not created any difficulties. By accumulating small orders until a full carload is available, the steel companies have been able to reduce by 10 to 20 per cent the number of cars used since the order went into effect. Underloaded cars can be sent out if quick action is essential by presenting the case to the railroads or through Army or Navy permission.

The section of Order No. 18 calling for the consolidation of two or three shipments in a single car does have several disadvantages. In actual practice, it has been found that for the second consignee to get his shipment has either been a matter of luck, or of oversight on the part of the first. Also, reloading has presented a prob-

lem. When the first shipment has been removed, the remainder must be loaded in tiers so that the car will be balanced. If not, derailling might occur. Improper sealing of the cars is another danger of multiple carloadings.

The short term policy of the ODT is to save car days. This is evidenced by Order No. 18 and by its orders to use the most direct serviceable routes, avoiding congested areas and terminals wherever possible and to classify freight cars during pick-ups, thereby

avoiding delays and congestion in yards.

The long term view of ODT is to cut down on car miles, thereby saving wear and tear of cars. One of the first projects undertaken by this agency was to map where steel products were being shipped by producers. By doing this, it hoped to discover, at least theoretically, where excessive transportation was taking place. One of the commodities so mapped was pig iron. The charts prepared showed that pig iron smelted in Birmingham was moving north and that made in the North Central and Eastern states was moving south. On paper this represented excessive hauls and to correct this apparently unnecessary usage of cars, the ODT suggested zoning for pig iron. This suggestion was withdrawn when ODT learned that pigs can and do differ in analysis and for practical purposes have to be treated as entirely different products.

A plan now in the works at ODT which probably will be ready for presentation some time in the summer has to do with a reorganization of the shipping schedule for large producers so that carriers can supply once each day a definite number of cars. In the days when the railroads were anxious to keep their customers, it was customary to send out a few cars several times a day. This practice ties up cars that would not be in use that day.

What this will mean to the steel companies is many more complicated forms to prepare and no assurance that all that effort would result in better scheduling. According to E. G. Plowman, head of the Transportation Section of the Steel Division of WPB, the production of steel is the primary requisite of prosecuting the war and transportation must adapt itself to fit the production picture. Mr. Plowman's solution is more freight cars.

The Steel Division is trying to eliminate excessive hauling wherever possible when scheduling allocations. The ODT suggests in addition to allocations as a means of eliminating excessive hauls, the informal exchange of orders by companies where this transfer would eliminate excessive hauls and where the product is, of course, the same. The third method would be the re-allocation of military orders so that the end product would be nearer its destination.

ODT expects that there will be a redistribution of plate orders when a new steel plate mill goes into production so that the users nearby will be supplied by this producer instead of having to get it from great distances.

### It Used to Be Scrap; Now It's Repair Part

• • • Like other industries striving to get along, the railroads are stretching material and supplies as far as possible. The Lackawanna Railroad this week reported some of its current practices, previously undreamed of. In its car repair program, old superheater flues are used as soil pipes in passenger cars. Air hose is repaired by splicing. Couplers and other parts are repaired, straightened or built up.

Rod bushings on locomotives are reclaimed by splitting them. Bolts are no longer cut off but are reclaimed. Cross-cutting the treads of multiple-wear steel wheels has been discontinued. Flanges are merely cut down to restore wheels to service. Side firebox sheets are patched when possible to lengthen the service of locomotives. Waterglass guards are made from steel instead of brass. Long bolts are shortened and rethreaded. Rod bushings are saved and reused. Crank pins and piston rods are made from scrap axles. Large axles are ground down to serve as smaller ones. Syphons are patched and kept in service.

The stores department requires that old or worn parts and equipment be turned in before new material is released. Steel strapping from inbound cars is used for tying and bracing lading shipped out of storage yards. Excelsior has replaced burlap for blocking holes in coal cars.



# THE NIGHT OF JANUARY 21<sup>st</sup>

It happened barely two years ago — on January 21, 1941 — and already it is changing the shape of the world. On that night, men held in their hands a bar of the world's lightest metal — the first ingot of pure magnesium to be taken from the sea.

The men were chemists and engineers of Dow Chemical Company, and the metal mermaid which they held that night was the creature of many years of experiment in the field of ocean mining. As a result of those years of search and research, most of our production of over 200 million pounds of magnesium this year will come from the limitless sea, and plants are building for the production of many times that amount. . . . Also as a result of those years, a whole new age of light metal parts, products — and problems — has begun.

Today, 99 per cent of all magnesium production is going into aircraft. But after this war, with a wealth of experience, new techniques and a yawning capacity, magnesium will be ready to bid for other markets: streamliners, busses, trucks, trailers, engine forgings, household appliances, building materials, and the whole broadening field where weight and load factors are of increasing importance. And with this new production will come the problems.

As specialists in internal grinding — with engineers and machines on nearly every aircraft production line in America — we at Bryant have had a great deal to do with parts made from lightweight metals.

We believe that this knowledge can be of greater value to you than ever before in meeting today's efficiency requirements and in planning ahead for tomorrow's. Bryant's Consulting Service is available to you at all times. Call upon us now!

**Bryant Chucking Grinder Company**

SPRINGFIELD, VERMONT, U. S. A.



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THE IRON AGE, April 15, 1943—87



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is coordinated by one centralized authority

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**TOWMOTOR**



**THE 24-HOUR ONE-MAN-GANG**

TOWMOTOR CORPORATION • 1230 E. 152ND STREET, CLEVELAND  
STRAIGHT-GAS POWERED INDUSTRIAL TRUCKS EXCLUSIVELY—SINCE 1919

88—THE IRON AGE, April 15, 1943

## NEWS OF INDUSTRY

Full authority in controlling transportation is vested in ODT. B. H. Taylor, deputy director of Transportation and Storage of WPB's Division of Stockpiling and Transportation has made it clear in a speech before the New England Shippers Advisory Board on March 18 that WPB in its transportation relations with industry has no intention of cutting across any of the delegated responsibility of ODT, but it would seem to impartial observers that a close liaison between ODT and those in the Steel Division who are experienced in transporting steel would certainly be a great step forward in eliminating some of the problems in steel distribution.

### OPA Indicts Tinplate Black Market Operators

New York

• • • Sale of tin plate for export, at prices over the ceiling, was charged in an indictment handed up last week in the United States District Court for the Eastern District of New York, against three defendants: Fein's Tin Can Co. Inc., Brooklyn; Irving Fein, vice-president of the company, and H. Silberberg, an employee.

The first count alleges that Fein's Tin Can Co. Inc., and Irving Fein wilfully sold and delivered, on April 14, 1942, to American Trans-Oceanic Sales Corp. and Corporation de Fomento de la Produccion, a foreign corporation, 4129 boxes of tin plate for \$56,891.08. The second and third counts charged the defendants with wilful failure to keep for inspection by the OPA complete and accurate records of each sale of iron and steel products, and with a wilful failure to file with OPA a record covering the shipment of 825,000 lb. of tin plate to the two corporations named on or before May 15, 1942, and with failure to support such filing by affidavit showing the name of the buyers of the tin plate and the prices charged therefor.

Herman Wolkinson, Senior Enforcement Attorney attached to the New York district office of OPA, had charge of the investigation.

### COMING EVENTS

April 12 to 16—American Chemical Society, Detroit.

April 28 to 30—American Foundrymen's Association, St. Louis.

April 29 to 30—American Institute of Mining and Metallurgical Engineers, Cleveland.

May 10 to 12—Mill Supply Convention, Cincinnati.

May 17 to 18—National Association of Sheet Metal Distributors, Cleveland.

May 17 to 19—American Gear Manufacturers Association, Rye, N. Y.

June 9 to 10—SAE War Material meeting, Detroit.




# ILLINOIS *Forging*

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**STRUCTURAL STAMINA**  
essential to maximum  
tool life!

Precise metallurgical control plays a most important part in the performance of high speed production tools. Specific composition, grain structure and hardness are fundamental factors in producing the tool best suited to the purpose for which it is designed.

Because correct forging contributes so greatly to tool endurance, "ILLINOIS" has its own modern forge shop where skilled craftsmen carefully work the metal to produce exactly the required structure.

For tools that must serve better and longer—call in "ILLINOIS."



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TOOL WORKS**

MANUFACTURERS OF METAL CUTTING  
TOOLS AND SHAPED PRODUCTS

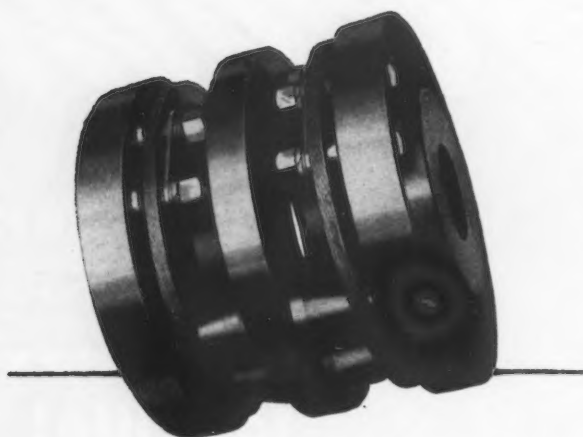
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FROM THE HUB OF AIR TRANSPORTATION**

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MILLING CUTTERS • GROUND FORM TOOLS • SPECIAL TOOLS



## THOMAS FLEXIBLE COUPLING FEATURES

### NO BACKLASH, NO WEAR, AND NO LUBRICATION . . .

Backlash does not exist with Thomas Flexible Couplings. The very vitals of connected mechanisms are thus protected from fatigue—not for a few months, but forever! Furthermore, while Thomas (all metal) Couplings are transmitting horsepower, and while at the same time they are compensating for parallel or angular misalignment, there is no stress, thrust, or cross pull on the bearings. Thomas Flexible Couplings are designed and manufactured by the only company in the world which specializes EXCLUSIVELY on production of flexible couplings. As you would expect from a company of specialists, it offers in its product exclusive features with SPECIAL BENEFITS. And, no other style, type, or design have Thomas' five features, all of which are necessary for a permanent, care-free installation. Write for catalog.

#### 5 ADVANTAGES

1. They eliminate backlash entirely.
2. They require no lubrication which collects harmful grit.
3. They are free from wearing parts which cause breakdowns.
4. They have fixed torsional rigidity.
5. They eliminate all end-thrust.

**Thomas Flexible Coupling Co.**  
Warren, Penna.



#### LABOR

### Wage Loophole Seen In New Wage Orders; Other Labor News

• • • The President's "hold-the-line" anti-inflation order of last week is viewed as still not being the last word required to stall off the unions. The loophole, left by Roosevelt as by anti-inflation legislation, is the right to make adjustments for substandard conditions or undue hardship cases.

Of primary importance to the steel industry was the freezing of the "Little Steel" wage formula. Frozen, as it appears to be by the order, some observers point out that no answer has been given to the fact that the cost of living has risen since May 1, 1942, and that no adjustment to the wage formula has ever been made to rectify this discrepancy.

• • • Following a four-day strike that started Monday, April 5, normal operations were resumed at the American Shipbuilding Co., Cleveland, Friday, April 9. The strike, labeled an "outlaw" work stoppage, tied up production at the West 54 St. shipyard where iron ore carriers and Navy Corvettes are being built. Nearly 40,000 man hours of production were lost on Naval escort vessels and

**EARTHBOUND TURRETS:** Gunnery students learn tricks of their trade on regulation bomber turrets mounted on trucks at Tyndall Field, Fla. The target is carried by a driverless jeep on a circular track.

*International News Photo*





# Jackets

for our messengers of death...

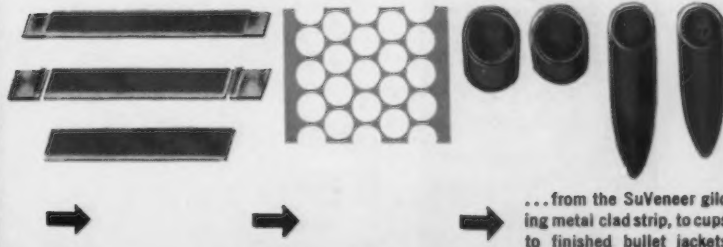
**D**OWN the narrow corridor of a gunner's sighting-line spin hot slugs of destruction to their mark . . . bullets wearing overcoats of a SuVeneer clad steel instead of the solid gilding metal jackets formerly employed.

A new fact, a new process—saving the country *thousands of tons of precious copper* a year for other war applications.

The SuVeneer\* Clad Metal accomplishing this result is an exclusive Superior development—a process permitted without charge to a score of other companies for use through "the duration" in manufacture of material for million upon million of bullet jackets.

When the war is won, SuVeneer Clad Metal will offer strip steel in combination with other metals and alloys for a variety of new uses—stimulating the creation of better products for peacetime living.

\*Trade Mark Reg. U. S. Patent Office



## Superior Steel

CORPORATION

CARNEGIE, PENNSYLVANIA



**THE  
Ford Tribloc  
Hook**  
**IS LIKE A  
SAFETY VALVE**

Watch the load hook on your **FORD TRIBLOC**. It is your first line of defense against overloading. Ford load hooks are drop-forged from special steel and heat treated—and while they possess ample strength for adequate safety factor, the steel is sufficiently ductile to permit the hook to open slowly without fracture before any part of the hoist is overstressed. **FORD TRIBLOC** hooks are your safety valve against dangerous abuse. . . . And when the bottom hook has begun to open, look to the top hook as well, for although the top hook is even stronger, it, too, may need attention.

With all steel products extremely critical—with production demands at the highest peak in all history—this is no time to abuse machinery. Make thorough inspection a regular routine. Insist upon proper maintenance. When given intelligent care, cleaned and lubricated at intervals, **FORD TRIBLOCS** will remain efficient under hardest usage for many long years. Be sure that they do.

**FORD CHAIN BLOCK  
DIVISION**

PHILADELPHIA • CHICAGO  
SAN FRANCISCO



**AMERICAN CHAIN & CABLE COMPANY, Inc.**  
BRIDGEPORT, CONNECTICUT

### Square Deal for Women

• • • More than 500 companies have equalized rates paid to women with rates paid to men for comparable work under the authority of the WLB's general order which permits such wage or salary adjustments without prior WLB approval. This order has been the basis for equalizing rates paid to more than 18,000 women, reports received by the Board up to March 15 showed.

ore carriers. The Maritime Commission will not assume control of labor relations at the yard, as was stated in some reports circulated after the return to work last Thursday, but corrective suggestions will be offered to both company and union officials.

• • • The War Manpower Commission last week voted to put the Cleveland area on the 48-hr. work week, effective May 16, which will affect the 600,000 persons employed in the city, half of whom are in war industries. The 48-hr. week will apply to all activities, essential and non-essential. WMC officials stated that the move was made to prevent Cleveland from becoming declared a critical labor area, thus preventing the city from losing war orders.

• • • High rates of labor turnover are causing a serious manpower situation in the nation's ship building program, the Maritime Commission stated last week. A deficit of 70,000 workers in the industry during the first quarter of 1943 is shown. The turnover rate on a national basis amounts to 11.2 per cent a month of the total working force, according to latest figures. Of this turnover only two per cent represents withdrawal of men to enter the armed forces.

• • • More than 12,000 tons of coal, urgently needed by the steel plants of Republic Steel Corp., have been lost due to a strike at the company's Crescent strip mine near Charleroi, Pa. The score of employees first went on strike on March 3, returned to work on March 10, went out again on March 20 and were still idle at the start of this week.

The strike resulted from a wage demand which officials of UMW have presented and which the company is willing to meet, provided the increases asked are approved by NWLB.



# Too Bad, Tojo

● Too bad for you, Tojo. You thought it couldn't be done. You guessed wrong. You forgot to reckon with the speed and adaptability of American industry to pitch in and supply our fighting men with equipment far superior to that of yours.

Here at The National Bronze & Aluminum Foundry Co., just one of the many thousand companies, producing for United Nations' Victory, special care is taken to see to it that every casting is of top-notch quality. Take this illustration for instance, it shows a casting going through rigid X-ray inspection. And when X-ray inspection is necessary, it receives the same minute care taken in all other operations in the production of National Sand and Permanent Mold Aluminum Castings.

Bye-bye, Tojo!



**ALUMINUM CASTINGS**

**BUY MORE WAR BONDS AND STAMPS!**

**THE NATIONAL BRONZE & ALUMINUM FOUNDRY CO.**

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**MAKERS OF QUALITY SAND AND PERMANENT MOLD ALUMINUM CASTINGS**

# America's Light, Medium and Heavy Tanks have

## FORGINGS BY STANDARD



War being the supreme test of materials and workmanship, it is again proving that Standard's reputation for dependable steel products, gained in time of peace, and other wars, is well deserved.

With its roots implanted, back in 1795, in the beginning of our Nation's history, Standard is today using the accumulated knowledge and experience of the intervening years to produce highest quality forgings and castings for equipment of our armed forces on land and sea, for war-time industry, and for the railroads.

The metallurgists and other trained personnel of Standard are acquiring added skill in meeting war-time demands that will be applied to industrial and transportation problems in the post-war period wherever quality steel forgings are required.



### STANDARD STEEL WORKS

DIVISION OF  
THE BALDWIN LOCOMOTIVE WORKS  
PHILADELPHIA

FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

## Briefly Told—

422,700,000 Man Days  
Lost in 1942; 383 Miles  
Of Pipeline Still Needed

• Middle western refineries ultimately will have to be supplied with crude oil from more distant sources, and therefore a pipeline from a central point in the West Texas field to a point of connection with existing pipelines that serve the middle western refining districts must be given serious consideration, says Petroleum Administrator Ickes. Recently a specific proposal from a private company was received for the construction of a 16-in. pipeline from near Lubbock, Texas, to the vicinity of Drumright, Okla. It calls for the private financing of approximately 383 miles of new line requiring a minimum expenditure of 42,645 tons of steel and approximately \$7,000,000.

• "Keep chopping for victory," is a new slogan issued by the chemicals division of WPB. Why? Because charcoal is needed. It goes into making many war materials (iron, copper, brass, etc.) and chemicals.

• WPB announced the formation of the Curriers and Transmission Belt Manufacturers' Industry Advisory Committee whose members are: George L. Abbott, Traton & Knight Co., Worcester, Mass.; E. H. Ball, Chicago Belting Co., Chicago; Robert M. Pindall, Jr., Alexander Bros., Philadelphia; John E. Schaefer, Hans Rees' Sons, Inc., New York. R. P. Butler is the government presiding officer.

• Chairman Donald M. Nelson, of WPB, last week wired congratulations to the Inland Steel Co., for breaking all previous production records in March. The company made 312,425 net tons of ingots in March, which compares with a previous monthly record of 304,676 net tons. March shipments bettered shipments in any previous month by 10,000 tons.

• Bureau of Reclamation power plants provided 70 per cent of the generating capacity added in 1942 to speed war production in the 11 far western states. The Bureau installed 393,500 of the 557,000 kilowatts added in the West. In 1943 the agency will



**DoAll  
PRECISION  
GRINDER**

**Smooth  
AS A  
MIRROR  
EVERY TIME**



**EXTRA WEIGHT**



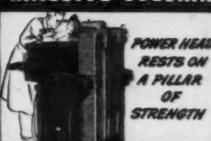
**EXTRA BEARING AREA**



**DIRECT DRIVE**



**MASSIVE COLUMN**



**PROTECTIVE SADDLE**



**NEW HYDRAULIC DRIVE**



● Especially designed and built with one purpose—to do the difficult task of super accurate grinding, so essential in our mass production program of today which calls for interchangeability of hundreds of vital parts.

The engineers worked for years to refine DoAll performance. Vibration is practically eliminated through rugged construction. Bearings are of larger area and hand scraped. Every part is so perfectly coordinated that you are assured of accuracy not only to size, but to flatness and parallelism.

## GRINDING AT ITS BEST

For that final operation—a smooth, mirror-like finish—a finish that will pass every rigid inspection test—that will make a surface accurate to less than a ten thousandth of an inch, investigate the DoAll.

When the finish is so perfect that you can actually “wring” two flat surfaces together—well, that’s super grinding—and that’s what the DoAll has to offer. Adaptable to either wet or dry grinding.

*Send for descriptive literature.*

## SAVAGE TOOL COMPANY

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Savage, Minn.

*DoAll offices in 25 cities, each in charge of a trained sales engineer to give you quick service on Surface Grinders, DoAll Gage Blocks, DoAll Contour Machines, Band Saws and Files.*

### DoAll CONTOUR MACHINES



Continental Machines, Inc., Minneapolis, Minn.

### DoAll BAND SAWS



The DoAll Company,  
Des Plaines, Ill.

### DoAll GAGE BLOCKS



The Measure Blocks of 1000 Unit, come in 3 accuracies: Working Set, Inspection Set and Laboratory Set.

Each set composed of 81 separate blocks.

# "BULLETS"

for the  
**Machine Guns  
of INDUSTRY!**



No defective ammunition wanted here! To speed Victory production, rivets must be round and true, accurate in size, uniform in material.

OLIVER makes that kind of rivets by the tons — in hundreds of sizes and types — as well as millions of bolts and nuts accurately made, cleanly threaded for quick, easy assembly and firm gripping.

Being specialists in the manufacture of fastening devices of all kinds, Oliver can provide the types best suited for your particular requirements.

**OLIVER**  
IRON AND STEEL  
*Corporation*  
PITTSBURGH, PENNSYLVANIA  
BOLTS . . . NUTS . . . RIVETS  
STEEL FASTENERS

## BRIEFLY TOLD

contribute 500,000 of the 825,000 new kilowatts scheduled for installation.

• *Curtiss-Wright Corp. has formed a new division to be known as the Development Division. Peter F. Rossmann, chief of development research in the airplane division research laboratory of the corporation, has been appointed general manager of the new division and will make his headquarters offices in the East.*

• *Indicating that conservation of 600 tons of high carbon steel and substantial savings of manhours can probably be attained through widespread application of "hand file reconditioning," the WPB Conservation Division is encouraging war plants to investigate the practice for their own use.*

The reports indicate that this procedure adds about 60 per cent to the original life of the file and the cost of reprocessing is only from one-half to one-third the cost of a new file.

• *Curtiss-Wright Corp. Airplane Division, Buffalo, has begun to hire boys 16 and 17 years old. Previous age limit was 18. The boys will work the first shift and most of them will be sent directly into production work. Those showing special aptitudes will be singled out for other assignments.*

• *Absenteeism during 1942 resulted in the loss of more than 422,700,000 man days in American industry, an increase of 72,000,000 man days over the loss in 1941, according to the National Industrial Conference Board. In order to compensate for this loss of time, the Board points out, it was necessary for industry to maintain 1,350,000 extra employees.*

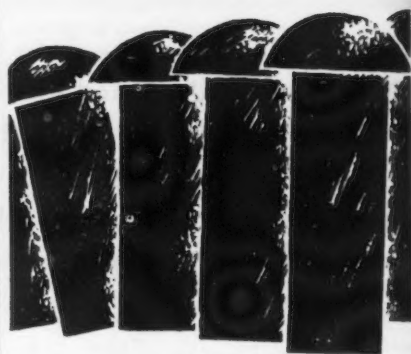
• *For industry, long baffled by the complexities of new manpower utilization problems which require top-flight personnel management, the WMC has provided a crew of experts in the shape of a Manpower Utilization Bureau. Operation of the Bureau will be completely decentralized, with consultants attached to the staff of each regional manpower director.*

It will be up to the men to help locate production bottlenecks due to improper manpower utilization, and to suggest means of dealing with the problems which have been uncovered.

• *Talon, Inc., Meadville, Pa., makers of slide fasteners, recently purchased controlling interest in the stock of Electroweld Steel Corp., Oil City, for an undisclosed sum. The latter com-*

# INDUSTRY'S *vital* **FASTENERS**

*must be*  
**UNIFORM  
ACCURATE  
DEPENDABLE**



The vital bolts, nuts and rivets you depend upon can help — or hinder — your speeded-up production programs. Your men haven't time to fuss with nuts that don't easily thread-on, or bolts that don't fit accurately.

Oliver takes special precautions to see that threads are clean and true, shanks and heads are accurately made to size, so that they help your men maintain high-speed production!

**OLIVER**  
IRON AND STEEL  
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PITTSBURGH, PENNSYLVANIA  
BOLTS . . . NUTS . . . RIVETS  
STEEL FASTENERS



*You're Darn Tootin'  
We're Proud!*



Official United States Navy Photo—General View of destruction following Jap sneak attack on Pearl Harbor. Note "DEMPSTER-DUMPSTER" bodies in foreground.

★ The thousands of red-blooded Americans who are putting everything they've got into building equipment to help speed up our march to victory are serving America . . . they have a right to be proud!

Little did we ever realize the vital part Dempster-Dumpsters were destined to play at Pearl Harbor, where, on December 7, 1941, a wreckage cleanup problem demanded action . . . speed. Fortunately, several Dempster-Dumpster hoisting units and a large number of Dumpster bodies of 6 cu. yd. capacity were on the spot . . . but for peace time service. They were pressed into war service immediately . . . bodies were rushed to most needed spots, and in an endless cycle, Dempster-Dumpster hoisting units placed empty bodies for hand loading of debris, hoisted loaded ones for hauling and automatic dumping and back again for more . . . never stopping for an idle moment.

No material handling equipment could

★ ★ ★

In an endless cycle, Dumpster Truck Unit hauls and dumps one body while others are being loaded.

have equaled the speed and vital service rendered by the Dempster-Dumpster during the days that followed that fateful December 7th.

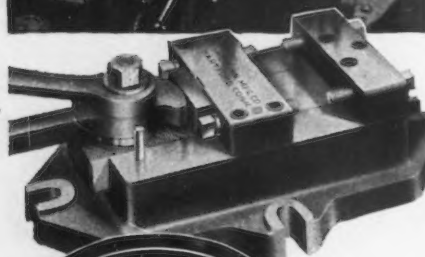
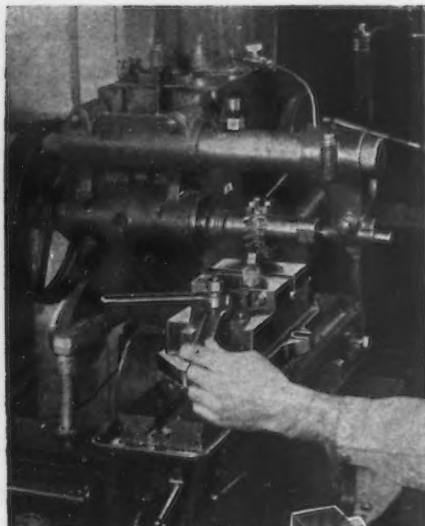
You're darn tootin' we're proud of the job our equipment did at Pearl Harbor.

This truck, gas, tire, time, and man power saving system for handling materials is going on in hundreds of our nation's leading war and industrial plants. Dozens of different types of material handling jobs are being simplified and speeded up with various types of standard and special Dempster Bodies. Be it a dust, liquid, heavy or light material handling job, inside or out of your plant, the chances are that the Dempster-Dumpster system will give you 4 to 8 times the efficiency of any other material handling plan.

Write now for completely illustrated catalog showing many types of Dempster-Dumpster services.

**DEMPSTER  
DUMPSTER**

**DEMPSTER BROTHERS, Inc., 343 Springdale, Knoxville, Tenn.**



## FENN

# QUICK ACTION VISES

### Special Features

**A**daptable to many milling, drilling, tapping and assembling jobs.

Precision built for accurate work.

Sliding and stationary jaws precision fitted.

All working parts (except base) hardened, ground steel.

Base made of fine grained, well seasoned iron for heavy duty.

Guaranteed to be exactly as represented or no sale.

Three sizes: 4", 5" and 7".

Send for Bulletin No. 10

**THE FENN MFG. CO.**  
HARTFORD, CONN.  
ESTABLISHED 1900

## BRIEFLY TOLD

pany makes pressure and mechanical steel tubing on resistance weld tube mills. This purchase involves no change in management and production of tubing will continue.

• Although a manpower shortage of skilled workers in the Pittsburgh district is already in the making, the most serious situation involves the availability of what is generally called "common labor." Some observers believe that the time has now come when the classification "common labor" should be done away with and some other label be substituted; such as, apprentice, learner, beginner, or possibly "basic workman."

• Books of the American Rolling Mill Co. are not yet closed for 1942 because renegotiation of government contracts is still pending, Charles R. Hook, president, reported last week. However, he indicated that net earnings were approximately \$7,700,000 after taxes and reserve for contingencies as shown by the tentative audited reports.

• Construction projects costing \$1,325,545,454 have been stopped during the past five months to free materials, equipment, and other resources for more essential war uses.

• "Canada will benefit more proportionately in regard to her war con-

**MOSLEM EXPERT:** Mohamed Ellahi Bukhsh, 62, is an expert in the use of precision tools at an Indian factory producing guns and shells with the aid of American machinery supplied by Lend-Lease.

OWI



# Gain in hours



Use Laminum shims to reduce parts machining for easier work tolerances in factory adjustment! More machine hours released for production.

Laminum shims (.003 or .002 inch precision laminations bonded into a solid unit) are cut to your specifications.

Stock shim materials obtainable from mill supply distributors. (Write us for sample and illustrated shim application chart.)

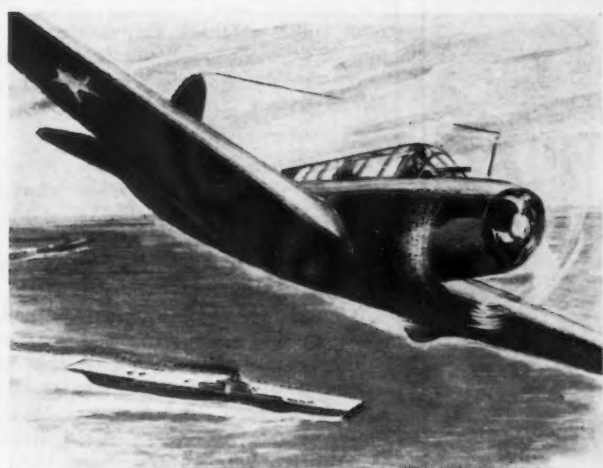
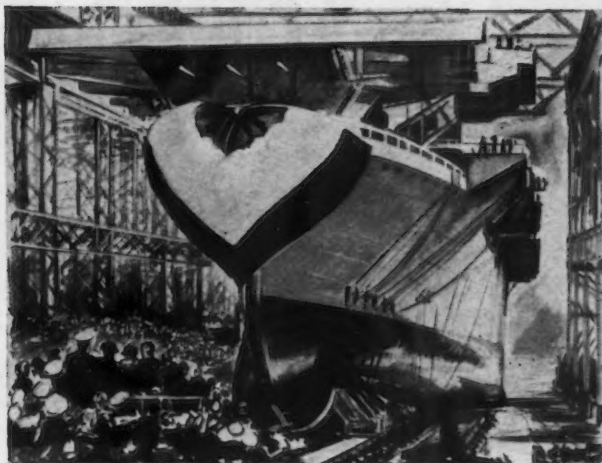
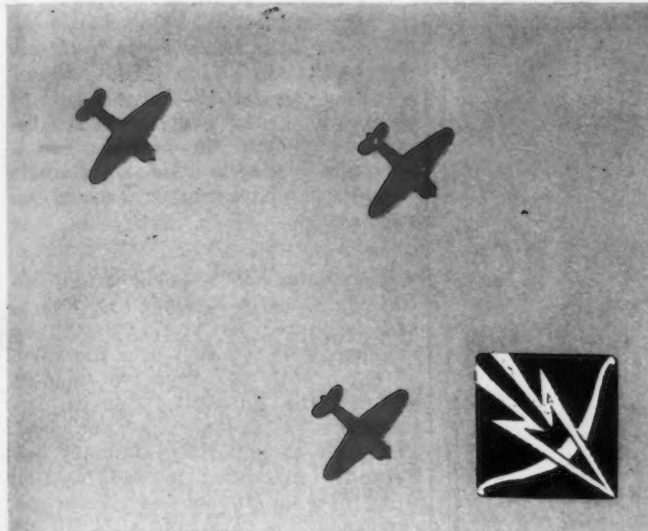
**Laminated Shim Company**  
Incorporated  
76 Union Street      Glenbrook, Conn.

*it's*

# LAMINUM

THE SOLID SHIM THAT *peels* FOR ADJUSTMENT





CHROMANG . . . . . Modified 19/9  
 MANGANEND 2MS . . . . . Ferritic Alloy  
 CHROMEND K . . . . . 19/9  
 CHROMEND K . . . . . 18/8 MO (Type 316)  
 CHROMEND 19/9 Cb. . 19/9 Cb.

Armor plate welded with ARCOS Chromang and Manganend 2MS is sailing the seven seas on combat duty with our armed and armored forces. The fabricators of these ships, planes, and tanks look to Arcos, the pioneer, as the logical source for armor welding electrodes. Our list of customers steadily grows larger because the all-round performance of Chromang and Manganend is showing its value on the production line. Write today for information.



**Distributors Warehouse Stocks in the Following Cities:**

Berger, Texas. . . . . Hart Industrial Supply Co.	Kingsport, Tenn. . . . . Slip-Not Belting Corp.
Boston, Mass. (Beimont), H. Boker & Co., Inc.	Los Angeles, Calif. . . . . Victor Equipment Co.
Buffalo, N.Y. . . . . Root, Neal & Co.	Milwaukee, Wis. . . . . Machinery & Welder Corp.
Chicago, Ill. . . . . Machinery & Welder Corp.	Moline, Ill. . . . . Machinery & Welder Corp.
Cincinnati, Ohio. . . . . Williams & Co., Inc.	New Orleans, La. . . . . Wm. D. Seymour Co.
Cleveland, Ohio. . . . . Williams & Co., Inc.	New York, N. Y. . . . . H. Boker & Co., Inc.
Columbus, Ohio. . . . . Williams & Co., Inc.	Oklahoma City, Okla. . . . . Hart Industrial Supply Co.
Detroit, Michigan. . . . . C. E. Phillips & Co., Inc.	Pampa, Texas. . . . . Hart Industrial Supply Co.
Erie, Penna. . . . . Boyd Welding Co.	Pittsburgh, Pa. . . . . Williams & Co., Inc.
Fresno, Calif. . . . . Victor Equipment Co.	Rochester, N. Y. . . . . Welding Supply Co.
Ft. Wayne, Ind. . . . . Wayne Welding Sup. Co., Inc.	San Francisco, Calif. . . . . Victor Equipment Co.
Honolulu, Hawaii. Hawaiian Gas Products, Ltd.	Seattle, Wash. . . . . Victor Equipment Co.
Houston, Texas. . . . . Champion Rivet Co. of Texas	St. Louis, Mo. . . . . Machinery & Welder Corp.
Kansas City, Mo. . . . . Welders Supply & Repair Co.	Syracuse, N. Y. . . . . Welding Supply Co.
	Wichita, Kansas. . . . . Watkins, Inc.



"QUALITY WELD METAL  
 EASILY DEPOSITED"



## Do you know how many **NEW** uses there are for *Stainless Steel* wire?

• Wartime need said time after time, "*this cannot be made of Stainless Steel, but it must!*" And it was—without argument but not without development work that will result in great gains to industry after the war.

Of course, this new knowledge of Stainless Steel and Stainless Steel Wire is of value only to the war effort today. But don't overlook its possibilities in your own plans for peacetime production.

PAGE STAINLESS STEEL WIRE will be offered you in a wide range of shapes such as channel, oval, half-round, flat, triangle, keystone, hexagon, octagon, etc., in diameters up to  $\frac{3}{8}$ ", and end section areas to .250 square inch.

# PAGE *Stainless Steel* Wire

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, New York, Pittsburgh, San Francisco

*In Business for Your Safety*

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

### BRIEFLY TOLD

tributions in postwar trade than will Great Britain," Dr. Cyril James, principal of McGill University and chairman of the government's advisory committees on postwar reconstruction, recently told the Senate committee on reconstruction and social security.

• The value of exports from the United States in January and February amounted to \$1,377,000,000, an increase of 44 per cent over the value of exports in the first two months of 1942, the Bureau of Census, Department of Commerce, announced. The value of imports in January and February amounted to \$463,000,000, a decrease of 10 per cent from the corresponding total of \$507,000,000 for January and February, 1942. Export totals exclude shipments to our armed forces abroad but include lend-lease goods shipped to the United Nations.

• Interdependence of nations in mineral supplies has increased sharply and creates a crucial problem of postwar international relations, it is brought out in a study by the Brookings Institution.

No nation is self-sufficient in minerals or is likely to be, but those which most nearly approach this situation are the United States, the British Empire, and Russia. Within their boundaries, the United States and the British Empire accounted for about 57 per cent of world production in 1939. To this may be added commercial control of production elsewhere, bringing the total to around 75 per cent. The output available to the United Nations is still enormously greater than that available to their adversaries, it is said.

The real difficulty facing the Axis powers with respect to minerals before the war was their inability to pay for imports, the report says.

• Domestic bookings of electric industrial trucks and tractors during the month of February totalled 284 units, figures released by the Industrial Truck Statistical Association, 208 South LaSalle Street, Chicago, indicate. The net value of chassis only booked during February totalled \$1,305,205 compared with \$1,639,547 in January.

• More than a million and a half horsepower in General Motors Diesel engines is being supplied to power an important percentage of the new destroyer escort vessel program of the Navy, says Secretary Frank Knox.

• St. Louis Southwestern Railway has purchased five 44-ton Diesel switch engines from the General Electric Co.



## BRIEFLY TOLD

• Mid-West Abrasive Co., Detroit, has established an engineering laboratory service to furnish ordnance makers and other mechanical parts manufacturers with precise readings on flatness and profile of work. The service is offered without charge to any manufacturer who requires such readings and does not have measuring equipment on hand.

• Extension of a mandatory 48-hr. work-week to all plants of the steel industry would increase total steel payrolls by an estimated \$100,000,000 a year, the American Iron and Steel Institute reported. The increase would come from the payment of time-and-a-half for more than 40 hr. of work per week.

• A pre-induction training manual in electricity to meet the War Department's expressed need for such instructions has been prepared by Carnegie-Illinois Steel Corp. The textbook, "Fundamentals of Electricity," covers the fundamentals of electricity required in pre-induction training for more than 35 Army occupations.

• Our immediate postwar car will be the 1942 car with such modifications and improvements as can be made without important engineering development or changes in tools, according to Alfred P. Sloan, Jr., chairman of General Motors, in a special message to the corporation's automobile dealers.

• A program for training women to replace men as production line supervisors has been developed by N. A. Woodworth Co., Ferndale, Mich. To date, nearly 100 women have successfully replaced men in that capacity.

• The first 100 job methods training groups which have been completed in the Pittsburgh area since the program was launched early in January by Training Within Industry, have shown significant results in all participating war plants in the area, C. S. Coler, district representative of TWI, announced recently.

• Owing to war conditions, the American Institute of Steel Construction has decided that, until the war has ended, no awards will be made in its annual bridge competition.

• April 1 marked the second anniversary of the pioneer installation of 1,000,000-volt industrial X-rays in the X-ray laboratory of the main works of the General Electric Co. The equipment has been used to make more than 45,000 radiographs of heavy castings and forgings.

## FOR THE

# War-Time Foundry-

## MORE TONS ★ PER HEAT

### THROUGH MODERN OPEN HEARTH DESIGN AND CONSTRUCTION!



Swindell 40-ton Open Hearth Furnace—one of many serving the metallurgical industry.

# SWINDELL FURNACES

## CAPACITIES FROM 5 TO 200 TONS

### ★ Send Us Your Inquiries!

## SWINDELL-DRESSLER Corporation

DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES  
PITTSBURGH, PA.



Speedi-Dri is a granular, oil absorbing substance, which is spread on floors to provide a non-skid surface—to soak-up and remove grease and oil.

As a safety-device it is unparalleled. It instantly provides a safe working surface—not only eliminating a cause of falls but also the fear of falling—and reduces the fire hazard of oil soaked floors. Unlike sawdust, Speedi-Dri will not burn.

Speedi-Dri works marked economies in floor cleaning. Its absorbency is so great that it actually draws old oil stains from wood and concrete floors. It makes expensive, messy scrubbing quite unnecessary. Because it can be easily swept up it requires no machinery, no interference with production, and fewer maintenance men.

Speedi-Dri has proved its economy in hundreds of busy war plants. It excels all other substances for the purpose in absorbency and coverage per pound, and it saves floors. Prompt service from warehouse stocks in principal cities. We urge you to see your distributor or to write us for samples. There is only one—

**SPEEDI-DRI**  
OIL AND GREASE ABSORBENT

#### SUPPLIERS

East — REFINERS LUBRICATING CO.  
New York City

Midwest and South  
WAVERLY PETROLEUM PRODUCTS CO.  
Philadelphia, Pa.

West Coast  
WAVERLY PETROLEUM PRODUCTS CO.  
Menlo Park, Calif.

## Three-Point Program Advanced To Assist Machine Tool Industry

• • • After examining machine tool earnings, sales trends, distributing costs and other factors, three fundamentals are apparent which must be recognized by the industry and the nation as a whole, says A. G. Bryant, president, Bryant Machinery & Engineering Co., and vice president, Cleereman Machine Tool Co., in a report recently completed at the request of the War Department. The three fundamentals are:

"1. The industry as a whole cannot afford to give up a dollar of its earnings under renegotiation procedures.

"2. Price levels at this time must not deteriorate, and in the face of higher costs and much lower volume later this year, some upward adjustments may be necessary.

"3. Any weakening in the discount basis to the long established machine tool distributors will be disastrous, not only to them but to the industry as a whole and, therefore, to the peacetime economy as well as to the wartime effort of America."

If the industry, the public and the government support these three fundamentals, "we believe the industry can be expected to survive," Mr. Bryant says. "It has done the impossible before, and there is no reason why it cannot give further exhibitions of tenacity. Even miracles, however, require some favorable factors for success."

Excerpts from Mr. Bryant's report, touching on the various phases outlined above, are:

"By equipping the country for war during 1940, '41, '42, and '43 the machine tool industry has practically put itself out of business for at least a decade. There are two questions: One is, how is the industry going to survive? The other is, what kind of treatment is the country going to give the industry now to preserve it for its future vital peace and wartime needs?

"Here is what occurred after the first World War: Machine tool production declined from 222 millions in 1918 to 23 millions in 1921. That was a drop of 90 per cent. What will happen when the machine tool industry declines 90 per cent from the high peak of its production in 1942?

"The machine tool industry, manufacturers and dealers, have a responsibility for servicing all of the 4 billion dollars of machine tools that will be in use after the war and which probably will continue in use for 20 or 30 years thereafter.

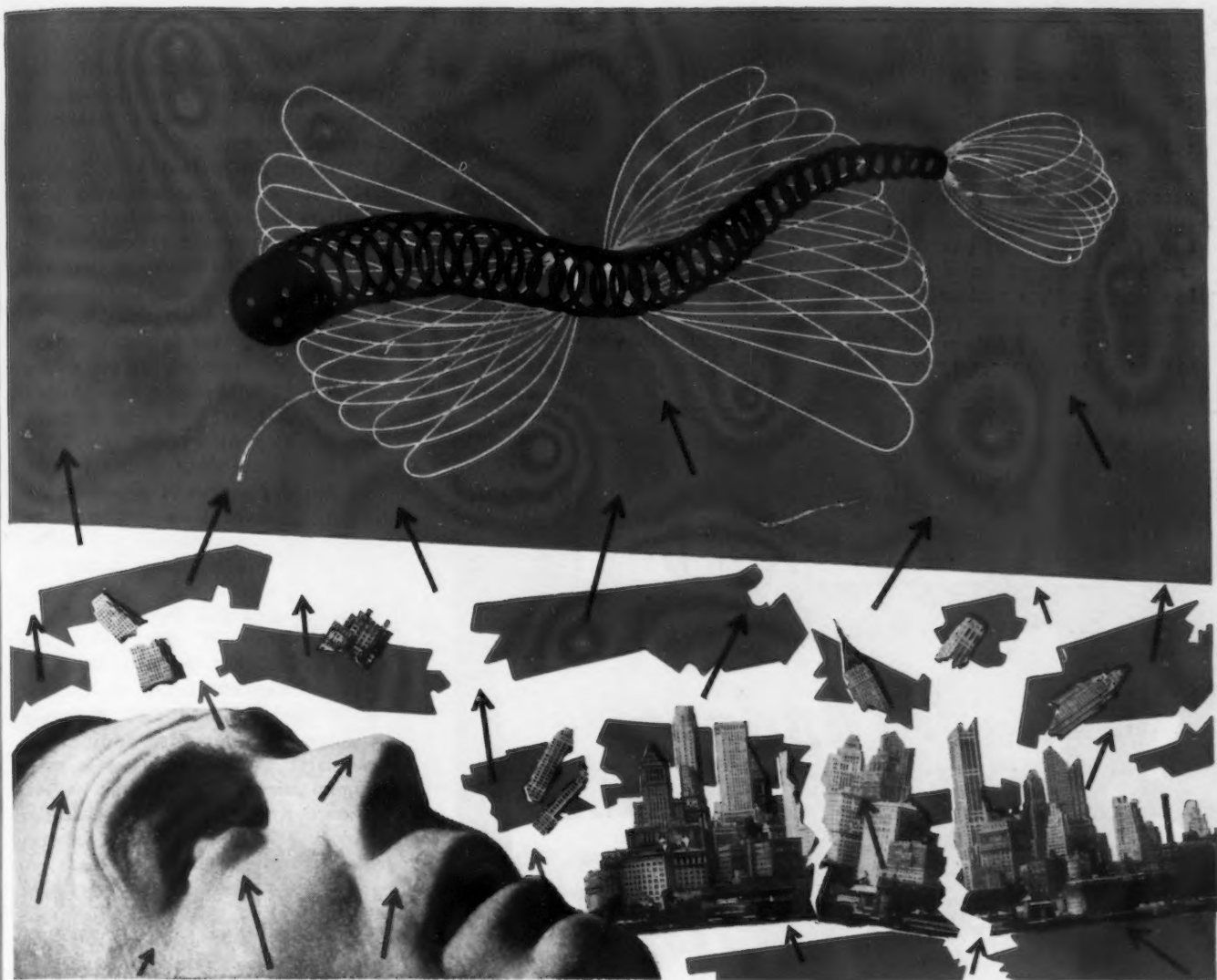
"With a 10 per cent sales volume,

**PEACE PARLEY:** CIO and AFL emissaries met in Washington March 31 for a renewed attempt at reconciliation. Left to right: Philip Murray, president CIO; Harry C. Bates, president AFL Bricklayer's Union; W. L. Hutcheson, president AFL Carpenter's Union; (back row) Julius Emmpak, secretary, CIO Electrical, Radio and Machine Worker's Union; George Meany, secretary-treasurer, AFL; Edward Flore, Steel and Restaurant Employees' Union president.

Press Assn., Inc.







## If worms had wings . . .

IF WORMS HAD WINGS, chances are our entire economy would collapse! All because their specialty—that of swallowing earth—is unique and indispensable!

The earthworms in a single acre of ground carry more than 18 tons of earthy castings to the surface in a year! Thus, by constant plowing, they make it possible for air, moisture and life-giving minerals to circulate . . . and so for all plant-life to flourish!

But if worms had wings, they'd never be satisfied with so plebeian an occupation as burrowing. They'd just fly around. And in the meantime, the whole world would go to pot.

The moral is plain: Specialization is of so great

importance that our modern world could not survive without it. Our democracy could not fight without it. Take machine tool production. We have overcome Germany's 7-year head start in about a year, and are even now outproducing the Reich in machine tools in the ratio of 5 to 1.

A potent factor in this production miracle has been the multiple spindle automatic lathe made by Cone. These titans of the machine tool industry are currently used in the production of so many different munition parts it would be difficult to list them all.

Remember that name—Cone Multiple Spindle Lathe. It will continue to make history after victory is won!

**CONE Automatic Machine Company, Inc., Windsor, Vermont**

how is the industry going to do a 500 per cent service job?

At the end of 1943 it is estimated that there will be \$4,000,000,000 of machine tools in service, after allowance for depreciation. To utilize this enormous volume of production facilities for peacetime pursuits, there would be required on a comparable basis a peacetime national income to support production reaching the enormous total of between \$400,000,000,000 and \$500,000,000,000.

"The machine tool industry, generally speaking, has never been a commercially, or financially attractive business. A study of machine tool companies typical of the industry indicates that since 1900, only about 1/3 of the individual years have been profitable. Machine tool companies have survived, not because of desirable earnings, but because the owner-managers of the companies have been ingenious and have had the fortitude and tenacity to live with their busi-

nesses, and through periods of strain such as would not be countenanced by any who are interested merely in financial returns.

"During the period 1937 through 1941, out of the accumulated gross earnings of the machine tool industry 54 per cent went for taxes, 18 per cent was for dividends, 28 per cent was devoted to plant expansion to meet defense requirements.

"Considering that corporation taxes now are approximately 80 per cent of earnings, it is apparent that there is not sufficient left for even moderate reserves for contingencies.

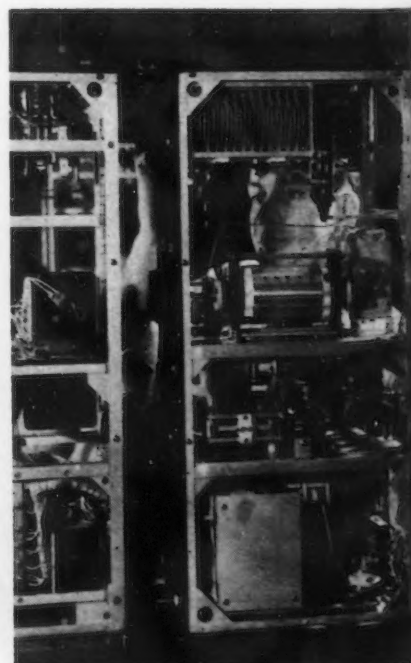
"An understanding of the machine tool industry makes it apparent that something more than 'moderate reserves for contingencies' will be required in this business during the next few years.

"In January and February of this year, the rate of new orders was about half of that occurring last summer and was about 1/6 of the rate that existed in March, 1942. Naturally backlogs of orders are falling precipitously. Yet, the industry is operating on price lists established in 1941, and earlier, and frozen by the OPA in October, 1941. Substantial increases in labor and material costs have occurred since these prices were established.

"The cost of distributing machine tools constitutes a relatively small portion of their sales price. Machine

**GETTING SET:** Soon this radio transmitter, now getting its first factory checkover after being assembled, will flash messages of split-second importance from a big Navy bomber to an aircraft carrier.

*Wide World*



## Wyandotte CLEANS 'EM ALL

Wyandotte Metal Cleaning and De-greasing Compounds are doing thorough production jobs on metals and alloys of every kind in all types of war production plants.

Wyandotte is on the metal cleaning job

—with service representatives headquartered in 88 North American cities.

—with storage stocks in 214 U. S. and Canadian carload warehouses.

Further information concerning Wyandotte Metal Cleaners and Wyandotte Technical Men may be secured by writing



**WYANDOTTE CHEMICALS CORPORATION**

**J. B. Ford Division**

**WYANDOTTE, MICH.**

*Offices in Principal Cities*





# TROUBLE SPOT



**Cities Service Precision Lubricants  
Protect this crucial Production Point!**

Right here, at the lip of tool and work-piece, is where trouble usually starts.

And right here, at this crucial production point, is where a machining fluid with stamina counts most. For while there are many different machining operations, there is only one best cutting oil for your particular job. That's the one that delivers "tops" in speed, finish and tool life.

Cities Service offers cutting oils of *proved performance* . . . especially designed to meet the most exacting requirements of wartime production.

Get in touch with your nearest Cities Service office today. For an informative booklet for users of cutting fluids write to Cities Service Oil Company, Room 1357 Sixty Wall Tower, New York City.

**OIL IS AMMUNITION—USE IT WISELY!**



**CITIES SERVICE OIL COMPANY**  
NEW YORK • CHICAGO

IN THE SOUTH  
**ARKANSAS FUEL OIL COMPANY**  
SHREVEPORT, LA.

tools, requiring as they do a degree of technical knowledge and production experience not needed in comparable industries, are distributed at a cost ranging between 10 and 12½ per cent.

"Some producers of machine tools have their own district offices and their own staffs of field engineers. This applies where the manufacturers have sufficient sales volume to maintain the highly expensive engineering organizations thus required. How-

ever, practically every manufacturer of machine tools, regardless of size, operates through distributors in at least some of the geographical centers.

"Our review of reports received from a large part of the industry, in 29 major centers from coast to coast and border to border, now indicates that in 1942 not more than 40 per cent of the machine tool volume was handled through distributors. Our estimate, based on actual reports totaling over

424 millions, is that 525 millions were sold through dealers out of a total production in the industry of 1320 millions. The obvious reasons for the decline in the percentage handled through distributors during 1941 and 1942 is that some of the greatest increases in volume of machine tools occurred in those types that are manufactured by the very large concerns that normally sell mostly through their own staffs, plus the effect of the increase in lend-lease shipments which are not handled by dealers.

"Analysis of financial reports of machine tool distributors responsible for handling at least 80 per cent of all the machine tools distributed through dealers in 1942 shows that the gross revenue received last year amounted to 11.04 per cent of sales volume. This means the entire gross profit or 'spread' between sales price and 'cost of goods.' For comparison, we list in the following the same item of gross income in percentage of gross sales.

	Per Cent		Per Cent
1937	11.46	1940	11.55
1938	11.79	1941	11.18
1939	11.53	1942	11.04

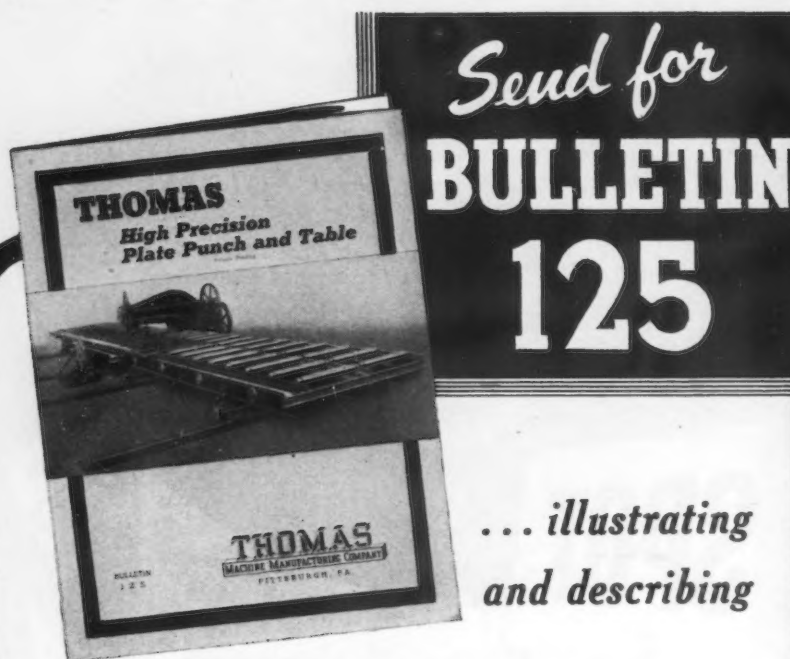
"A summary of financial reports of the machine tool distributors, above mentioned as responsible for 80 per cent of the business sold through dealers and already mentioned as having a gross margin of 11.04 per cent, shows that their combined net profit after taxes was 1.68 per cent in the peak year of 1942. Following are the percentages of net profit to sales for the last six years for all reports available:

	Per Cent		Per Cent
1937	2.76	1940	2.40
1938 Loss	1.08	1941	2.81
1939	1.12	1942	1.68

"Such a low percentage of profit to sales at the all time peak of volume in the industry is indicative of anything but financial strength in the distributing branch of the industry.

"If most machine tool manufacturers were required today to cease operations, they would find much of their supposedly liquid funds tied up in brick and mortar and inventory. Similarly, most dealers would find that the modest surpluses that they have earned to date would, if their current orders were precipitously cancelled, have little reserve on which to carry their organizations through the aftermath of readjustment and of stagnation.

"The greatest danger is that manufacturers and dealers alike may be lulled into a false sense of prosperity; and may, therefore, yield complacently to various pressures."



## THOMAS Plate Punch and Table

BULLETIN 125, just off the press, gives you details of the newest of Thomas equipment for punching all kinds of plates, ship, tank, boiler, cars and other plates so essential to today's production needs. The high precision, ease of operation and positive control obtained with these new tables is outlined in this new bulletin. Get your copy now!

**THOMAS**  
MACHINE MANUFACTURING COMPANY

PITTSBURGH, PA.

FABRICATING MACHINERY



# Electroweld Tubing

**SAVES IN WEIGHT AND IN**

**FABRICATING COSTS**

**T**HE latest type electric weld tube mills are found at Electroweld Steel Corporation. The accuracy and dependability of this equipment coupled with the most modern testing facilities permit production of a product with three distinct benefits—safety, savings in weight, and savings in cost.

This equipment forms tubing from strip steel which is rolled accurately to gauge. Thus the wall thickness is uniform, and lighter gauge material may be used without sacrificing strength. As a result, there are no thin spots in the wall of Electroweld Tubing, and you save weight. The strip steel meets your specifications accurately, and after it is formed into tubing the strength at the weld and adjacent areas will equal that of the strip steel. Every foot of Electroweld Tubing is hydrostatically tested for safety. Therefore, it not only meets your specifications but also Government requirements.

Electroweld Tubing may be adapted economically to boiler, heat exchanger, and condenser installations as well as to mechanical applications since it may be cut, formed, and welded more easily. During the post-war period, you will find it worth-while to consider Electroweld Steel Corporation YOUR source of supply.

Uniform diameter  
Uniform wall thickness  
Uniform physical properties  
Test proven welds  
Scale-free, silver-bright finish  
Square cuts, minimum burr

**Electroweld**

## Electroweld STEEL CORPORATION • OIL CITY, PA.

Manufacturers of pressure and mechanical steel tubing

## Zone Basis Price Schedule Announced For Heavy Line Steel Warehouses by OPA

### Washington

• • • Tables of specific dollars-and-cents prices for virtually all prime quality iron and steel products sold by heavy line steel warehouses in four eastern marketing areas are issued April 9 by OPA. They will enable the industry to determine its maximum prices with more uniformity than formerly, and also to arrive at results more precisely in line with prices on April 16, 1941, the base date for the industry.

Possibly by next Fall, similar tables will be provided for marketing zones throughout the entire United States. The action, is Amendment No. 14 to Revised Price Schedule No. 49 effective April 15.

While in some instances the prices are slightly higher or lower than those that existed previously, their general level within each zone is that of the April 1941 base date that was established when the schedule was issued on December 15, 1941.

The zones established are:

**Zone 1.** The entire states of Maine, New Hampshire, Vermont, Massachusetts, and Rhode Island.

**Zone 2.** The eastern section of New York State, including 24 counties; all of Connecticut; and 10 counties in the northern section of New Jersey.

**Zone 3.** The entire states of Delaware, 37 counties in eastern and southern Pennsylvania; 11 counties in central and southern New Jersey; 22 counties in the eastern and southern part of Maryland; 54 counties in Virginia; 76 counties in North Carolina; and 3 counties in West Virginia.

**Zone 4.** The District of Columbia and 28 counties in the eastern section of Virginia.

The counties are named in the amendment.

In general the products covered include structural shapes, plates, floor plates, hot rolled bars, cold finished bars, reinforcing bars, hot rolled strip, cold rolled strip, cold rolled round

edge flat wire, hot rolled sheets, cold rolled sheets, galvanized sheets, long terme sheets, enamelling sheets—in carbon, alloy and stainless grades.

While the aggregate of base prices, spread, and extras or deductions for identical products are uniform throughout one zone, one variable pricing factor prevents the occurrence of any flat zone prices. The variable is freight, which produces the same maximum price for two identical products only when the seller's and buyer's locations also are identical. Thus prices vary from place to place within a zone, although they are uniform for any one destination.

In determining the maximum delivered price to the buyer, the seller consults tables that contain the charges, extras and deductions for the particular products to be priced, and to which he is directed by a master index for each zone that indicates precisely where to find the specific figure.

Following is an example of application of the new system. A shipment of 12,000 lb. 26 ga. 36 x 96 in. Long Terme Sheets is to be made from Philadelphia, to Baltimore, within zone 3.

With Pittsburgh as the basing point

TABLE OF BASING POINT PRICES  
(Rate per 100 lb., in dollars)

### I. Carbon steels:

Products	Bethlehem	Buffalo	Claymont, Del.	Cleveland	Coatesville, Pa.	Pittsburgh	Sparrows Point	Worcester, Mass.	Youngstown
Structural shapes.....	\$2.10	\$2.10				\$2.10			
Stair stringer channels.....						2.45			
Junior beams.....						2.10			
Plates.....			\$2.10	\$2.10	\$2.10	2.10	\$2.10		\$2.10
Floor plates.....						3.35			
Black iron plates.....			2.35	2.35	2.35	2.35	2.35		2.35
Abrasion resisting plates.....			3.10	3.10	3.10	3.10	3.10		3.10
Hot rolled carbon bars.....		2.15		2.15		2.15			
Cold finished carbon bars.....		2.65		2.65		2.65			
Reinforcing bars.....		2.15		2.15		2.15	2.15		2.15
Hot rolled strip.....				2.10		2.10			2.10
Cold rolled strip.....				2.80		2.80		\$3.00	2.80
Cold rolled round edge flat wire.....				2.80		2.80		3.00	2.80
Hot rolled sheets.....		2.10		2.10		2.10	2.10		2.10
Cold rolled sheets.....		3.05		3.05		3.05			3.05
Galvanized steel sheets.....		3.50				3.50	3.50		3.50
Galvanized iron sheets.....		4.05				4.05	4.05		4.05
Galvannealed sheets.....						4.25			
Long terme sheets.....						3.80			
Black iron sheets.....		2.35		2.35		2.35	2.35		2.35
Abrasion resisting sheets.....		3.10		3.10		3.10	3.10		3.10
Enameling sheets.....				3.35		3.35			3.35
Electrical sheets.....									
Core loss 1.30.....						3.55			
Core loss 1.17.....						4.05			
Core loss 1.01.....						4.95			
Core loss 0.82.....						5.65			
Core loss 0.72.....						6.15			
Core loss 0.65.....						7.15			
Core loss 0.58.....						7.65			

### II. Alloy steels. Base prices to which mill analysis extras may be added:

Products	Bethlehem	Buffalo	Cleveland	Pittsburgh
Hot rolled alloy bars.....	\$2.70	\$2.70		\$2.70
Cold finished alloy bars.....		3.35	\$3.35	3.35

### III. Stainless steels:

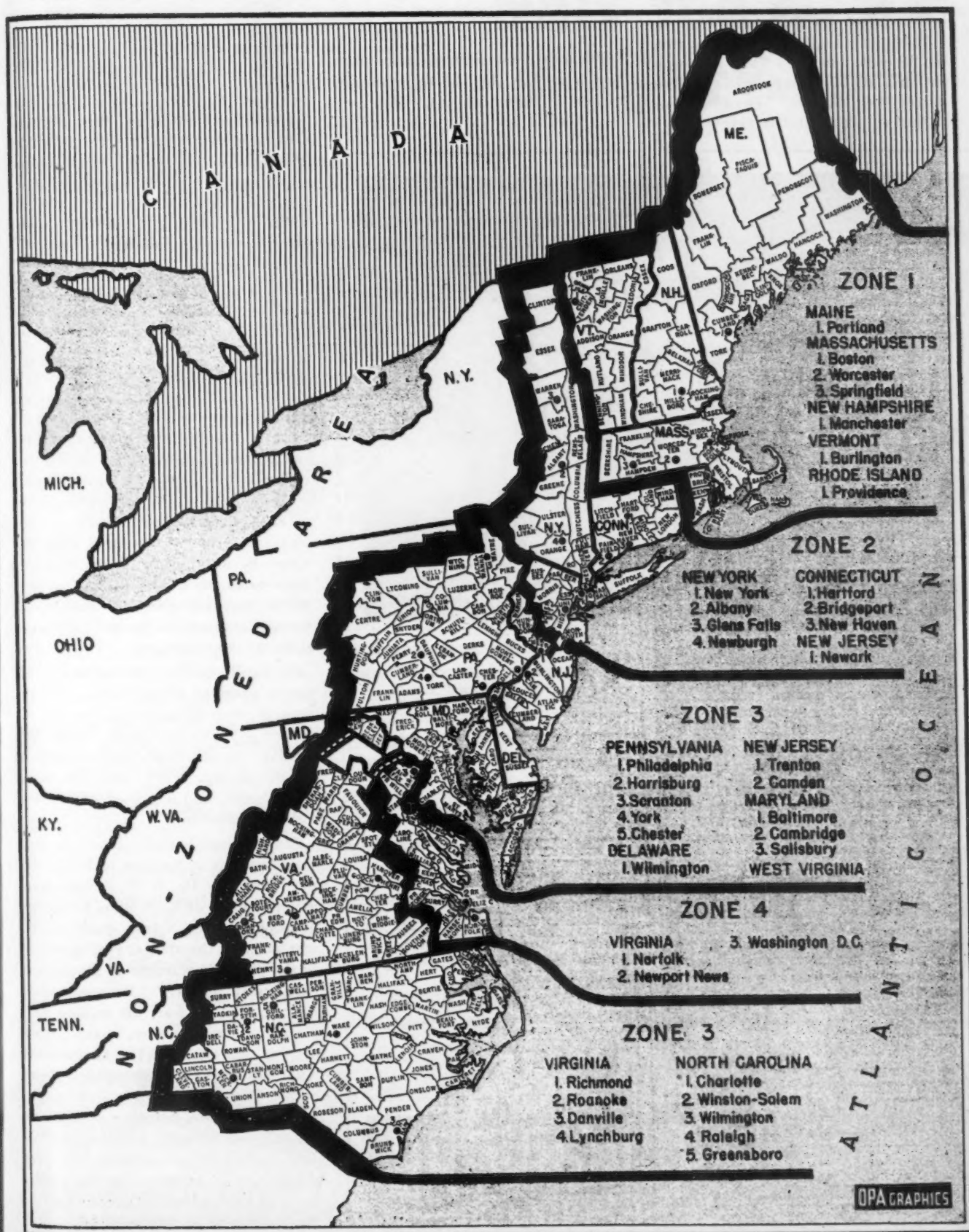
Type No.	Prices at Pittsburgh		
	Stainless sheets	Stainless bars and angles	Stainless plates
302.....	\$34.00	\$24.00	\$27.00
303.....	36.00	26.00	29.00
304.....	36.00	25.00	29.00
308.....	41.00	29.00	34.00
309.....	47.00	36.00	40.00
316.....	48.00	40.00	44.00
317.....	58.00	50.00	54.00
347.....	45.00	33.00	38.00
410.....	26.50	18.50	21.50
416.....	27.00	19.00	22.00
420.....	33.50	24.00	28.50
430.....	29.00	19.00	22.00
440.....	33.50	24.00	28.50



## Warehouse Steel Price Zones Delineated

• • • This map is the first accurate delineation of the exact states, counties and boundaries of each of the four eastern price zones established for heavy line iron and steel warehouses in Amendment 14 to Revised Price Schedule 49 as amended by OPA on April 9,

effective April 15. OPA states that the zones and method of pricing were developed by cooperation with the warehousing industry to follow along established lines of trade. A fifth zone is reported to be under discussion now and a complete zoning of the entire nation by early Fall is expected.



the base price per 100 lb. of the sheets is \$3.80. The freight is \$0.422 per 100 lb. (including the 6 per cent increase and 3 per cent transportation tax).

A deduction of 25c. per 100 lb. should be made for quantities between 3,500 lb. and 39,999 lb.

There is no allowance for quality and merchandising. The reference for size, shows an applicable charge of 25c. per 100 lb. There are no cutting or miscellaneous extras.

The sum follows:

	Rate per 100 lbs.
Price at basing point .....	\$3.80
Freight .....	.422
Spread .....	1.79
Quantity .....	minus .25
Size and gauge .....	.25
	6.012

The maximum delivered price therefore is \$6.012 per 100 lb. multiplied by 12,000 lb. or \$721.44. This price may not be exceeded either by the

amount of the invoice when all transportation charges are paid by the seller, or by the amount of the invoice plus all usual delivery service costs paid by the buyer when the shipment is made collect.

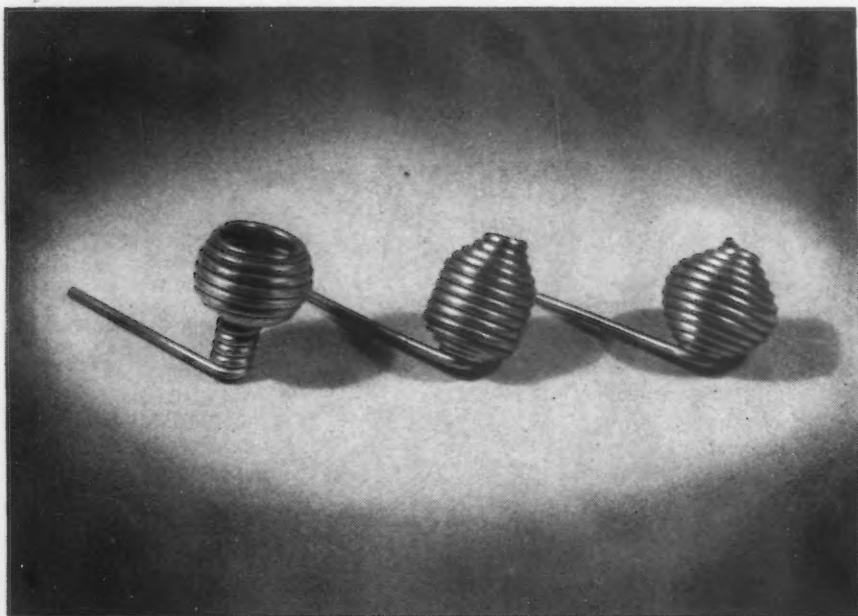
## Fairless Reports to WPB on Steps Taken by C-I

• • • B. F. Fairless, United States Steel Corp. president, reported last Thursday to WPB's Steel Industry Advisory Committee on the steps taken by U. S. Steel's subsidiary, Carnegie-Illinois Steel Corp., as a result of the misconduct of some of its employees recently reported to the Truman Committee.

Personnel changes in the organization of Carnegie-Illinois have been made, and, if the investigation—which is continuing—shows the need for further changes, they will be made, Mr. Fairless said. He declared that he did not condone any misrepresentations or falsifications, but added that the only motive which his investigation uncovered was the desire, under wartime pressure, to produce and ship the maximum possible tonnage of ship plates. Improper procedures were followed in attempting to reach maximum production, he said, but assured WPB that all possible precautions would be taken to prevent a recurrence of the incidents.

H. G. Batcheller, steel division director, presided at the meeting. Others present were: Chairman Donald M. Nelson, Charles E. Wilson, WPB, Executive vice-chairman, representatives of the Army, Navy, and Maritime Commission, and members of the Advisory Committee.

Mr. Fairless' verbal report was supplemented by a lengthy technical report made by Dr. R. E. Zimmerman, vice-president of U. S. Steel in charge of research. Mr. Nelson spoke briefly, emphasizing the special responsibility to the public in wartime of all persons engaged in industry. He emphasized that, in time of war, 130 million people had a direct interest in the output of war materials and that business must be conducted with this special responsibility in mind. He complimented the steel industry as a whole on the magnificent job that it has done and expressed confidence that in the future all members of the industry will take adequate precautions in the production of war materials.

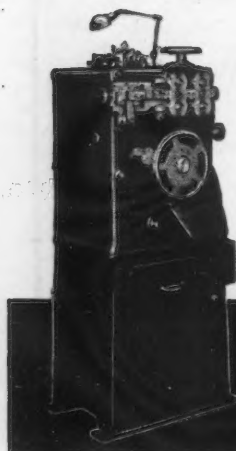


**M**ANY spring forms are easily coiled on a Torrington Spring Coiler with torsion attachment which are impossible to make by any other means.

While the samples illustrated are a peace-time product for ornamental use, they are indicative of the versatility of the Torrington Coiler.

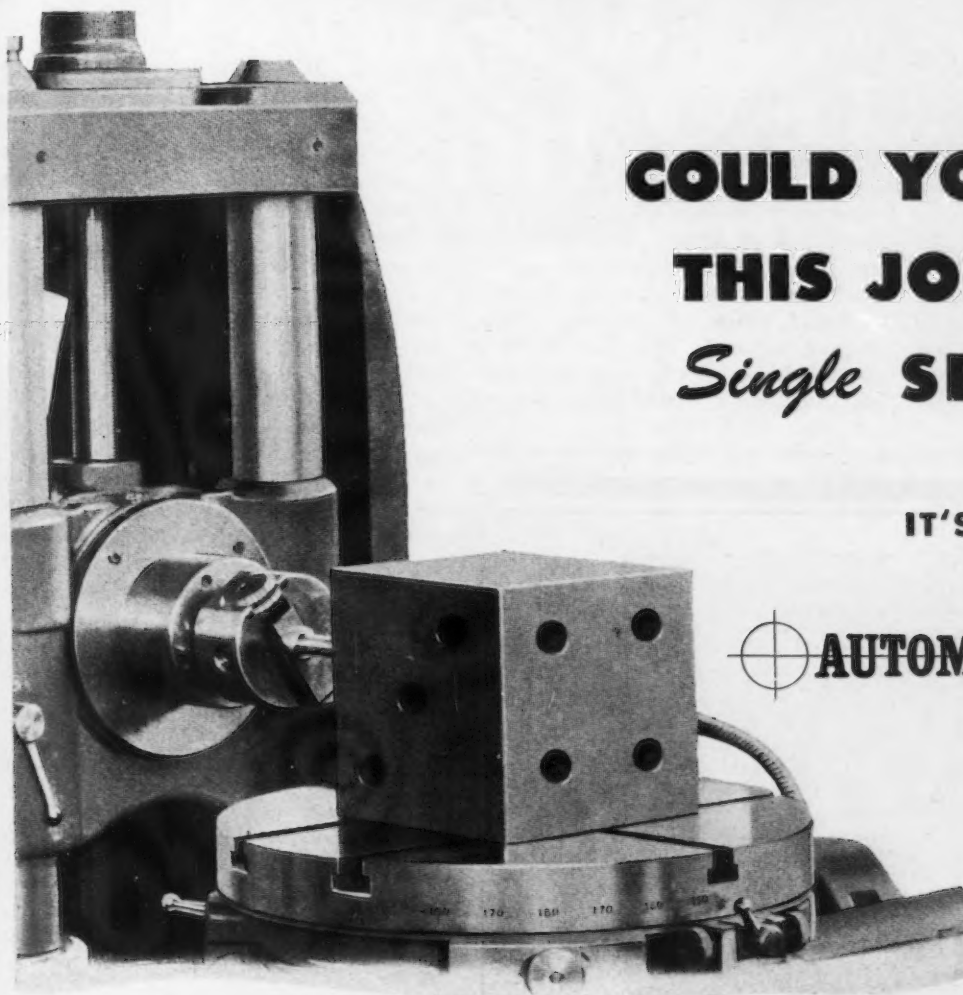
Such springs are practical and can be produced rapidly and accurately. Attachments are available for production of a variety of special types of springs beyond the normal range of Torrington Coilers.

If you have a problem calling for an unusual spring, consult a professional springmaker, who undoubtedly owns Torrington Coilers. Consultation with Torrington engineers is also available.



**THE TORRINGTON**  
MANUFACTURING COMPANY  
TORRINGTON, CONNECTICUT






# COULD YOU BORE THIS JOB IN A *Single* SET-UP?

IT'S A "Natural"

WITH THE

 **AUTOMETRIC** MODEL B

The illustration shows a typical time-saving operation on the Autometric Model B. All of the holes in all four sides or at various angles in a box jig or production part are produced with one clamping of the work piece.

Its ability to handle a complete job in a single set-up—more rapidly and accurately than ever before—makes the Autometric Model B indispensable equipment for the precision boring of a wide variety of parts.

## Model B Autometric Features:

- Errorless measuring — more rapidly, more accurately — by the Autometric method.
- Infinite variation of spindle speeds by finger tip control.
- Infinite selection of feeds by finger tip control.
- Hardened — ground — and super-finished steel ways.

Write for complete information on the  
Model B Autometric Jig-Boring Machine.



*Buy Victory...*

WITH AT LEAST 10% IN WAR BONDS

Rotary Head  
Milling Machine

•  
Autometric  
Jig Borers

•  
Center Scope

## Kearney & Trecker *Products*

C O R P O R A T I O N

Milwaukee, Wisconsin

Subsidiary of Kearney & Trecker Corporation

Milwaukee  
Face Mill Grinder

•  
Milwaukee  
Midgetmill

•  
Milwaukee  
Speedmill

## Blended CMP-PRP Predicted; Other Impending Revisions Forecast

• • • Some factors now point to an ultimately complete wedding of the Controlled Materials Plan and PRP operations with such a fine and gradual blending that industry hardly will be aware of the change and yet may one day awake to find a smoothly working plan which contains the re-

financed basics of both plans without the headaches of either. Observers who are in daily contact with the operations and revisions of both plans for a broad scope of industries have warned for some time that WPB is getting farther away from the original concepts of CMP daily. At the

same time PRP constantly is being revised to knit the two together more closely during the changeover period—a circumstance which is believed to be sure to result in permanent integration.

Other trends and impending changes in CMP, according to Washington sources include: A revised allotment procedure which will eliminate quarterly allotments and applications for allotments; allotments may be made on an annual basis and possibly longer terms on certain long cycle contracts such as locomotives. Revisions in allotments will be made by WPB as required thus eliminating quarterly reaffirmation of allotments by contractors. However, a form similar to PD-25-A will be available to manufacturers for requesting allotment assistance.

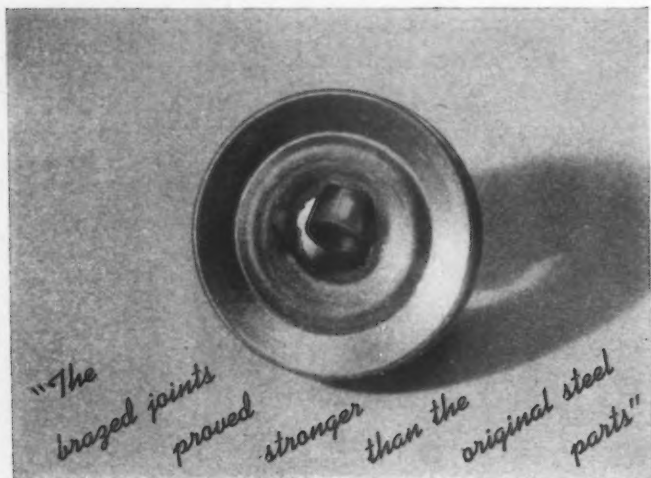
Split ratings appear about to be removed from individual products for Class A product manufacturers but are slated to remain for Class B product makers. Split ratings had the effect of limiting production to the smallest allotment when applied to individual Class A products, hence, will be eliminated. Form CMP-L-150, for use by Class product manufacturers, however, contains provisions for up to three ratings thus indicating the continuance of split ratings there. This form is expected to be adopted by all Claimant Agencies soon.

New report forms issued to component manufacturers are requiring increasingly more paper work instead of the opposite as promised by WPB. One, issued to motor and generator makers, requires a breakdown to 15 different classifications and requires a maze of intricate statistics. This information is said to limit the necessary trips to Washington by manufacturers but paper work continues to mount.

### CMP Deadline Advanced To Aid Cold Drawn Producers

• • • Breaking the April 15 deadline for the transition to allotment numbered orders as opposed to rated orders, WPB notified makers of cold drawn carbon and alloy steel bars that May 1 would be the effective deadline.

Producers of alloy steel were told to keep their melting schedules for June open until May 1 and to accept rated orders for hot rolled alloy bars and tube rounds from non-integrated cold drawn bar mills and tube manufacturers up to May 1 for delivery in July. Integrated cold drawn bar producers were told that no June meltings should be scheduled for rolling



## Design Your Metal Parts For Copper Brazing

Miscellaneous steel assemblies are joined 60 to 75% faster at 1/4 the former labor cost by the copper brazing process.

"Greatly improved results—neater, stronger joints—60 to 75% faster, at about one-quarter the former labor cost," that briefly is the report received from the production manager of a prominent midwestern plant after installing an E F continuous copper brazing furnace for joining some of their steel assemblies.

Within a month after installing their first brazing furnace, a second similar but larger furnace was ordered for joining other products—both furnaces are now operating side by side, joining all kinds of assemblies—large and small—neatly, economically and securely.

Products difficult or expensive to make in one piece can be made in several pieces and joined—thus not only reducing the cost but actually improving the quality and appearance. Products requiring several stampings joined or requiring screw machine parts, forgings and stampings to complete the unit, can be neatly and economically joined right in the production line in your shop.

Any number of joints in the same product or any number of pieces can be

joined at one time. The most intricate parts or assemblies are made to actually "grow together," and joints made which are as strong, or even stronger than the original parts. On some parts it is possible to anneal and braze in one operation.

Investigate the brazing process for your products. With slight changes in design you may be able to join your metal assemblies neater, cheaper and stronger by this method.

Send for printed matter showing various types of EF copper brazing furnaces.

**Investigate the Copper Brazing Process for Joining  
YOUR Metal Parts**

**The Electric Furnace Co., Salem, Ohio**

Gas Fired, Oil Fired and Electric Furnaces—For Any Process, Product or Production



## AN OPEN LETTER TO

# \*\*\* Paul V. McNutt:

### LAMSON CORPORATION

PNEUMATIC DISPATCH TUBES • MECHANICAL CONVEYORS OF ALL KINDS

SYRACUSE, NEW YORK

March 1, 1943

The Hon. Paul V. McNutt, Chairman  
War Manpower Commission  
Washington, D.C.

My dear Mr. McNutt:

#### Manpower Waste in Handling Materials

The President's "Manpower" order of February 9th emphasizes the vital necessity of greater production -- not only more goods per worker due to longer hours but also more goods produced during each one of those hours. Yet one proven source of increased production remains largely unrecognized and untapped.

It is not generally known or realized that Materials Handling Operations consume at least 30% of the total time required to produce manufactured articles. This covers the movement of materials through the manufacturing, storage, and shipping stages. The manpower savings, when manufacturing plants properly apply materials handling equipment, are indeed prodigious, resulting in an amazingly rapid amortization.

We, of the materials handling industry, have countless case histories proving the effectiveness of conveyors and other types of materials handling equipment in increasing production per man hour. Typical of war-production speed-ups are the following - taken at random from our files:

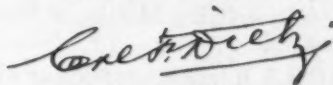
1. Shell-fuze production increased 2½ times.
2. Aircraft accessories production quadrupled with but 25% increase in personnel.
3. Approximately 300,000 man hours of messenger service saved annually in a large bomber plant.

Despite examples like these, which our industry as a whole can multiply a thousand-fold, not one industrial plant in ten employs an engineer whose sole duty it is to find ways and means of reducing this 30% production time loss with its consequent wasted man hours.

Strangely enough, few plants invite a general survey by a qualified materials handling engineer to help eliminate such waste. Furthermore, so far as we have been able to determine, not one technical school in the country includes in its curriculum a course in materials handling as a major subject.

We are bringing this situation to your direct attention so that it may be recognized as one of the very important factors in planning effective manpower use.

Very truly yours,



Carl F. Dietz  
President

CFD  
emk

## LAMSON CORPORATION • SYRACUSE, N. Y.

or drawing for delivery after June 30 unless covered by an allotment number. Non-integrated producers of cold drawn bars were warned that hot mills could not accept rated orders after May 1.

### WPB Allotments to Common Component Makers

• • • To assure manufacturers of critical common components of uninterrupted production schedules, WPB took steps by means of a directive

contained in CMP Bulletin 24 to smooth the flow of allotments by instructing the Claimant Agencies involved to allot 100 per cent of controlled materials for the second quarter, 80 per cent for the third quarter, 60 per cent for the fourth quarter and 40 per cent for the first 1944 quarter. Such advance allotment is expected to permit uninterrupted production schedules while the agencies are processing their complete allotments for each month.

## 1<sup>ST</sup> CHOICE *in the* AIRCRAFT Industry



Typical of DEMPSEY installations for the Nation's leading industries... this aluminum melting furnace installed at Buick Motors Division of General Motors

**MORE ALUMINUM** for Aircraft Engine Castings and extruded parts passes through **DEMPSEY FURNACES** than all other types of furnaces combined

**FASTER** Melting Time • Simple Single Valve Control • Easy Control of Tapping Speed • Special Metal Saving Models for Chip Melting • Sturdy Long Life Construction • Oil, Gas or Coke Fired.

These are some of the reasons why DEMPSEY furnaces are such an overwhelming choice for aluminum melting... these, plus the valuable reservoir of experience offered by DEMPSEY engineers and the fact that speed of installation is assured by the wide variety of types and sizes, the plans and patterns for which are now ready.

Write for literature on these and DEMPSEY Furnaces for Recirculating, Homogenizing, Pre-heating and Heat Treating

**DEMPSEY INDUSTRIAL FURNACE CORPORATION**

SPRINGFIELD, MASSACHUSETTS

**FURNACES—OIL & GAS BURNERS**

Offers Combined 50 Years' Experience Building:

DEMPSEY FURNACES since 1917 • GILBERT & BARKER since 1926



### CMP Changes

**Exporters** who receive orders for controlled materials to be shipped abroad will be permitted to use the allotment number applied thereon to pass on to their suppliers, according to General Directive 1 to Controlled Materials Plan Regulation No. 4. (WPB-3094)

**Automotive replacement parts**, automotive maintenance equipment and similar material have been added to the maintenance, repair and operating supplies for government agencies that are to be covered by CMP Regulation No. 5A, according to Amendment No. 1. (WPB-3125)

**Plumbing and heating** division has issued a new list of Class B articles which that industry will produce under the interpretation of components by the CMP. (CMPL-163)

**Class A products** may not be treated as the same if they are to be differentiated by width, thickness, temper, alloy, finish, method of manufacture, etc., according to Interpretation No. 4 to CMP Regulation No. 1.

**Sheet metal building product** applications for controlled materials have been divided into four groups and applicants have been asked to file applications for these materials upon separate forms. (CMPL-170)

**Direction 3 and 4 to CMP Regulation No. 1** was issued clarifying the place of preference ratings on copper wire and cable and on all brass mill products during the month of April. (WPB-3147)

**Dealers, distributors and jobbers**, who are permitted to extend priority ratings under the terms of CMP Regulation No. 3 have been granted assistance until June 30, 1943, on orders which have already been placed, in Direction 1 to CMP Regulation No. 3. (WPB-3122)

**Aluminum bars and rods** have been placed under tighter restrictions by Direction 2 of CMP Regulation No. 1.

**Carbon steel product producers** are being given specific load directives for production of specified products monthly for export. (CMPL-168)

**Alloy steel producers** have been notified to accept orders for hot rolled alloy bars and tube rounds from non-integrated cold drawn bar mills and tube manufacturers up to May 1; delivery in July. (CMPL-175)

For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph.





# FOR QUICK ACTION

● Our wartime strategy of making wheels only 3" in diameter and under is approved and endorsed by W P B. We make a 24-hour a day job of it. All vitally needed wheels are shipped promptly. There is no let-up. Our central location gives us a head start on deliveries.

**Custom Built Wheels**, just the right wheels for your particular job, no matter how precise or difficult it is.

The moment we have your grinding problem, it's turned over to abrasive engineers who make up the wheels that do your job better and faster.

Years of research and Specialized\* experience are behind each Chicago Grinding Wheel.

You can depend on prompt deliveries. GET IN TOUCH WITH US!

**TEST WHEEL**—Tell us the kind of job and size wheel you need. We'll be glad to send one without charge.



\*Half a century of specialization has established our reputation as the Small Wheel People of the Country.

**CHICAGO WHEEL & MFG. CO.**  
1101 W. Monroe St. Dept. RA Chicago, Ill.

Send Catalog. Interested in

☐ Grinding Wheels ☐ Mounted Wheels ☐ Send Test Wheel. Size \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

RA-4

## Jobbers Protected on Rated Orders

### Washington

• • • Dealers, distributors and jobbers, who are permitted to extend priorities ratings under the terms of CMP Regulation No. 3, as amended, have been granted assistance until June 30, on orders which have already been placed, to prevent discrimination against their rated orders to which

allotment numbers have not been applied. This section was announced by WPB with the issuance of Direction No. 1 CMP Regulation No. 3.

Orders without allotment numbers or symbols, placed by dealers, distributors, or jobbers prior to April 7, calling for delivery not later than June 30, must be deemed of equal rating to orders bearing the same

grade of rating with allotment numbers or symbols.

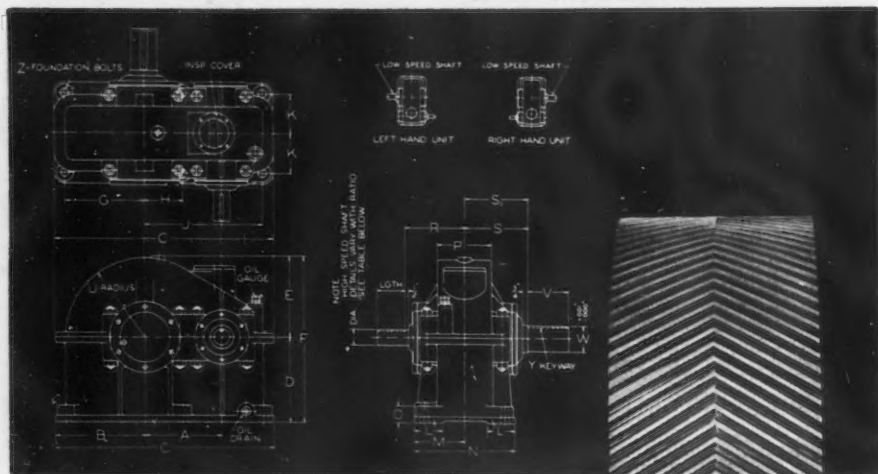
## Exporters Permitted To Accept Allotments

### Washington

• • • Resellers of controlled materials who ship them to foreign countries (other than Canada) are permitted to accept allotments from their foreign customers, and pass them along to producers of steel, copper and aluminum in this country in placing orders for these items. The foreign customers might receive the allotments from the BEW or Lend-Lease.

General Direction No. 1 under CMP Regulation No. 4, issued on April 6, permits this action by resellers.

## BLUEPRINT for VICTORY



*Victory over*

• SHOCKS  
• STRESSES  
• WEAR  
• NOISE

Farrel-Sykes continuous-tooth herringbone gears meet the need for that extra strength and load-carrying capacity demanded in wartime production. Precision-generated by the famous Sykes process, these gears are "naturals" for use with heavy-duty, high speed machines . . . working day and night at maximum capacity.

The combined characteristics of overlap or interlacing of the teeth, creeping engagement and inclined line of pressure reduce wear and maintain the involute profile and correct tooth action

throughout the life of the gears. Opposed helices balance and absorb axial thrust within the gear member, eliminating harmful thrust loads and resultant stresses on other parts of the machine. These inherent advantages of Farrel-Sykes gears result in continuous high efficiency with minimum maintenance and operating costs.

There is a Farrel-Sykes Gear and Gear Unit for every type of service and for any capacity. Farrel engineers will be glad to help you solve your gear problems.

**FARREL-BIRMINGHAM COMPANY, INC.**

344 VULCAN ST.

BUFFALO, N. Y.

The Gear with



a Backbone

## Some Machines Moved From GMPR to MPR-136

• • • Manufacturers of steam cleaning equipment, degreasing machines, metal washer parts, and manufacturers' optical processing machinery were provided by OPA with a pricing formula more suitable to their own pricing systems.

The items were transferred from the control of GMPR to Maximum Price Regulation No. 136 in Amendment No. 77 to the latter regulation which becomes effective April 12.

## Export Reserve Directed; CMP-8 Steel Report Required

• • • Steel producers were given new directions last week by WPB setting up load directives of products for export against BEW orders; and requiring monthly reports of shipments and past due orders of controlled materials.

The load directive specifies amounts of products which are to be produced monthly and held against BEW orders, in effect reserving a fixed amount of production against which export orders can be drawn.

All producers of carbon and alloy steel and wrought iron, except castings, are now required to make a monthly report on shipments and past due orders of controlled materials. Form CMP-8 is to be used for the report and the first accounting is required for the month of April. CMP-8 was pointed out as not being suitable





**Here's another 10 seconds the Axis won't get!**

**You don't stop** or slow down the machine to change tools with Apex Quick Change Drill Chucks. And a few seconds saved repeatedly, give you extra *productive* man hours per week per machine.

Green hands catch on quick to these simple, rugged chucks. A flip of the wrist changes drills, taps, reamers, counterbores, etc.—on drill presses, radials, lathes, hand screws, electric and air tools. Plunger design prevents dirt from clogging hole. Ball nose plungers guaranteed not to fall out during life of chuck. Morse taper shanks are standard; others to your specifications. Write for the complete catalog of Apex production tools, No. 14.



# APEX

**THE APEX MACHINE & TOOL CO., DAYTON, OHIO**

Manufacturers of Safety Friction Tapping Chucks, Quick Change and Positive Drive Drill Chucks, Vertical Float Tapping Chucks, Parallel Floating Tool Holders, Power Bits for Phillips, Slotted Head and Clutch Head Screws, Hand Drivers for Phillips and Clutch Head Screws, Aircraft Universal Joints, Plain and Universal Joint Socket Wrenches.

for the reporting of castings and a new form is expected to be issued soon to cover these products.

### No Relaxation Seen On Cast Iron Pipe Quota

Washington

• • • There will be no relaxation in restrictions on the manufacture of cast iron soil pipe, it was emphasized at a recent meeting of the WPB Cast

Iron Soil Pipe and Fitting Industry Advisory Committee in Washington. The announcement was made, said a WPB statement, to correct what appeared to be a general impression in the industry that pig iron and scrap were in plentiful supply.

Suggestions were made that pipe and fittings and job castings be segregated when reporting inventories so that a clear picture of Victory pipe sales might be shown. Efforts are being made to assist producers in

disposing of existing stocks of extra heavy pipe and fittings. A task committee was appointed to study means to conserve transportation facilities.

### A-4 Rating Revoked On Steel Sheet for Drums

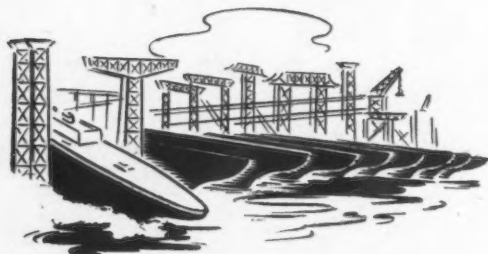
Washington

• • • Preference Rating Order P-76, which assigned an A-4 rating to steel drum manufacturers for the procurement of hot-rolled sheet steel, was revoked last Thursday by WPB. At the same time, General Preference Order M-45 was amended to eliminate reference to Order P-76.

Under M-45, steel drum manufacturers are required to set aside a specified inventory of hot or cold rolled sheet steel to make steel drums under specific order of WPB. In addition sheet steel acquired by use of the A-4 rating, which was assigned by P-76, had to be so reserved and used.

Order P-76 no longer is useful, since manufacturers now apply for allotment number under CMP. Such applications should be addressed to the WPB Containers Division, Washington, D. C.

## Ships on the Production Line



### ACP Products save time and step-up efficiency in Navy and private shipyards

Just as ACP DEOXIDINE helped make the mass production of automobiles possible . . . and as ACP RODINE boosted the efficiency and volume of steel production . . . so, today, these and other ACP Products are helping build the vital bridge of ships.

RODINE in pickling baths, saves both steel and acid and prevents pitting and burning of plates. It minimizes acid embrittlement, making plates easier to machine,

bend and drill. DEOXIDINE is the time-tested acid cleaner. On aluminum ventilating ducts and superstructure sections, it removes oil, eradicates corrosion and neutralizes corrosion-producers. LITHOFORM chemically coats galvanized surfaces to prevent the characteristic blistering and peeling of paint.

All three have long served their apprenticeship with the growth of American Industry.

Among the other ACP Products are: FLOSOL, an exceptional soldering flux for steel, brass, copper, tin,terne plate, zinc and galvanized iron; KEMICK, a chemical paint that holds to and protects metal surfaces even when heated to redness; CUPRODINE copper coats steel by simple immersion.

These and other ACP Products are available to you in speeding production of the vital bridge of ships. The experience of the ACP laboratories in metal treating and finishing processes is at your service.

**AMERICAN CHEMICAL PAINT CO.**  
MAIN OFFICE AND WORKS  
AMBLER . . . PENNA.

**ACP**

CHEMICALS  
ACP  
PROCESSES

DETROIT, MICH., 6325 Palmer Ave., E.  
CANADIAN BRANCH  
WALKERVILLE . . . ONT

### Ohio Area to Use Same Auditing Plan for PRP-CMP

Cleveland

• • • Because it has worked successfully in guiding operation of the PRP, the regional WPB for Ohio, Kentucky, West Virginia and Western Pennsylvania will use its present auditing system to supervise CMP.

Frank M. Aldridge, regional WPB compliance chief, said all manufacturers operating under either plan would be audited regularly. New staff arrangements have been made to take care of this task.

### Quotas Changed On Farm Tool Exports

Washington

• • • Changes in provisions applying to export of farm machinery and equipment were made last Thursday by WPB in amendment Order L-170. The most important changes are the following:

Quotas of farm machinery and equipment that may be shipped to North Africa to meet immediate needs in French Morocco, Algeria and Tunisia are established. Approxi-



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# FLASH Welding?



**H**ERE is the first of Progressive's new standard line of flash-welders, a 150 KVA machine available either for conventional manual operation or with the spectacular new "Flash-trol" monitor which automatically controls the rate of feed to prevent short-circuiting of the welding arc.

*Ask for Bulletin No. 201*

**PROGRESSIVE WELDER CO.**  
SEAM, PROJECTION & BUTT • Electric Welding Equipment • PORTABLE GUN & PEDESTAL  
3050 E. OUTER DRIVE  
DETROIT, U.S.A.

mately 80 per cent of the quotas will be repair parts.

Schedule B-7 is revised by increasing Canadian quota percentages for certain items. Quota percentages to European neutral countries on Schedule B-4 are reduced from 61 per cent to 32 per cent. The amount of farm machinery and equipment and repair parts saved by this reduction will be held by the BEW in a reserve pool to meet emergencies.

## L-192 Tightens Control On Construction Machinery

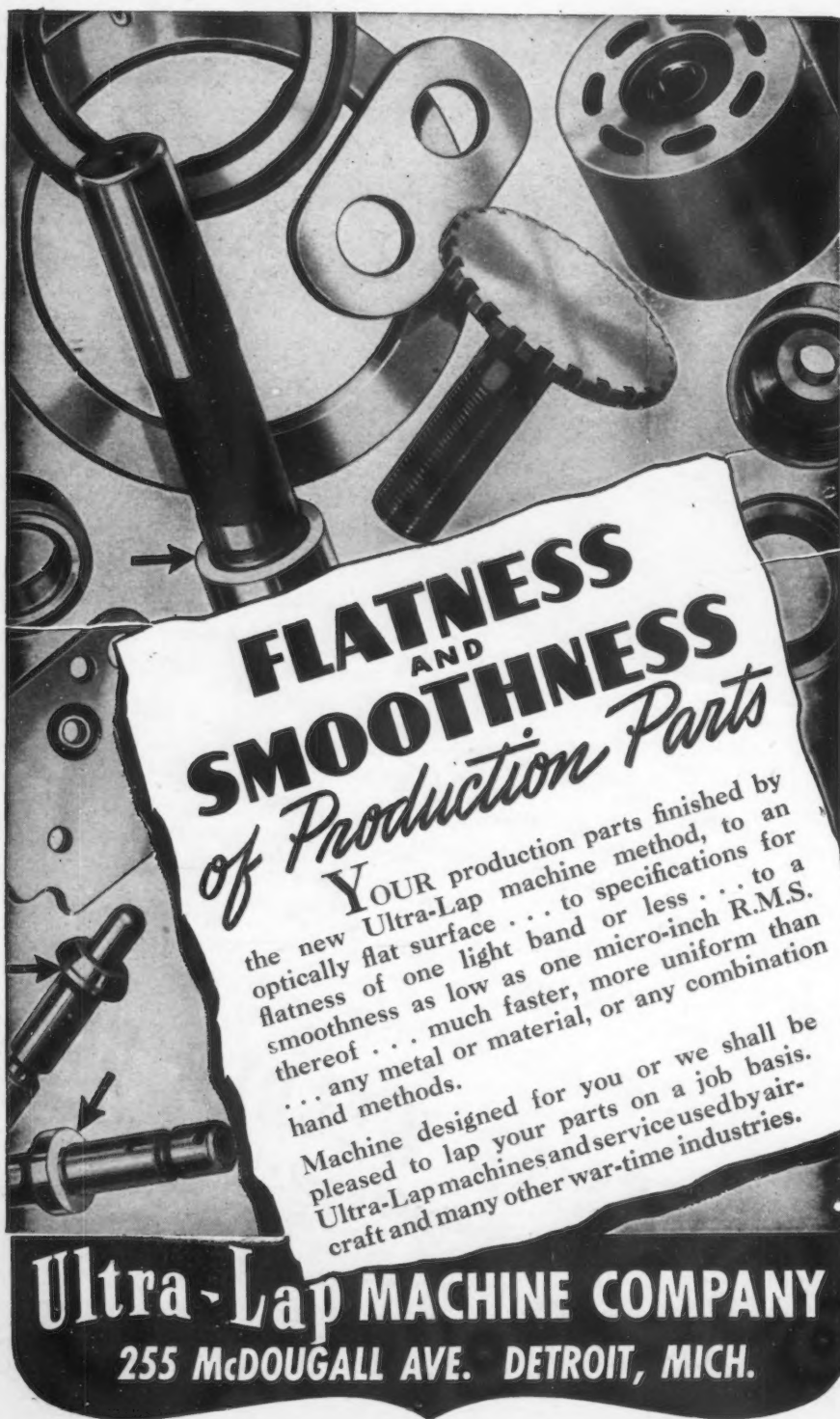
Washington

• • • Production and sale of certain types of construction machinery and equipment are prohibited and other specified types may be produced only for the armed forces and Lend-lease purposes under the terms of Order L-192 as amended last Friday by WPB. The amended order, which ef-

## New PD-1A Required

• • • Firms and individuals who normally apply on Form PD-1A are warned by WPB officials that, beginning April 15, only applications made on the revised version of that form issued Jan. 16, 1943, will be considered.

The new form is printed in two colors, yellow to be used in applying for preference ratings for items to be exported without further processing in the United States, and white for all others.



**FLATNESS  
AND  
SMOOTHNESS  
of Production Parts**

YOUR production parts finished by the new Ultra-Lap machine method, to an optically flat surface . . . to specifications for flatness of one light band or less . . . to a smoothness as low as one micro-inch R.M.S. thereof . . . much faster, more uniform than . . . any metal or material, or any combination hand methods.

Machine designed for you or we shall be pleased to lap your parts on a job basis. Ultra-Lap machines and service used by aircraft and many other war-time industries.

**Ultra-Lap MACHINE COMPANY**  
255 McDOUGALL AVE. DETROIT, MICH.

fects all items of construction machinery and equipment (over 100 types) to some extent tightens the controls imposed by the original order issued Nov. 7, 1942. It sets up four schedules (in place of the former three) in which specified items are grouped according to the degree and nature of the limitations and restrictions.

## M-126 Releases Some Steel

Washington

• • • Many Civilian Products in which the use of steel has for some time been barred will soon be available in limited quantities as a result of an extensive revision of Order M-126 releasing inventories which have been frozen for three to eight months for use in about twenty items for which they were originally intended. The inventories are estimated roughly at about 3000 tons. No new steel may be used in the items involved.

## Copper Again Limited

• • • To conserve copper and copper base alloys used in the manufacture of electrical wiring devices, the WPB issued Limitation Order L-277 barring the use of these metals for the current-carrying parts covered by the regulation. Order M-9-c prohibited the use of such materials for non-current-carrying parts.

## Locomotive Parts Aided

• • • A producer of locomotive parts who also is making locomotives pursuant to a schedule approved by WPB is protected in the manufacture of parts needed to fulfill the prescribed schedule for the completed product, according to Interpretation No. 2 to Limitation Order L-97, issued April 12 by WPB.



MANPOWER INCREASED

3 TIMES

OPERATOR HANDLES

## 11 Operations... ON 3 PLATEN TYPE FASTERMATICS

These steel sleeves for airplane engine crankcase bearings require eleven operations including boring, turning, facing and chamfering. The operations are divided over three (3) Foster Platen Type Fastermatics—automatic production lathes. One man handles all three machines, completes a part every 7 minutes.

### ENTIRE MACHINING CYCLE AUTOMATIC

The Platen Type Fastermatic is generally constructed with 3 tool carrying units: a front and rear cross slide and a main slide, all of which are mounted on a platen. The platen is hydraulically actuated, moves tooling to working position, and after all operations are completed, recedes to starting position and stops.

The Platen Type Fastermatic is extremely simple to operate. The entire machining cycle is automatic and as in this case, one operator can usually handle several machines.

The Platen Type Fastermatic is an ideal machine for high production work requiring moderate tooling. For similar work requiring more extensive tooling, investigate the Foster Fastermatic Turret Lathes.

**FREE:** Write for the new "Fastermatic" Catalog. Learn about the outstanding time-saving features of these highly productive, automatic "Fastermatic" Turret Lathes. Write to Foster Division, 1108 Beardsley Avenue, Elkhart, Indiana.

### Rough Steel Forging



1st Operation

2nd Operation



3rd Operation



### FASTERMATIC DATA

Part—Sleeve for airplane engine crankcase bearing.  
Material—Steel.

Tool Set-up—For three machines as follows:

1st Machine—Rough and semi-finish O. D. 7.790".  
Rough and semi-finish face 1.600".  
Rough bore inside diameter.  
Rough chamfer 45°.

2nd Machine—Rough finish bore large and small I. D.  
Rough and finish other face.  
Finish face inside lip.  
Turn .080" radii in corner.  
Chamfer I. D.

3rd Machine—Finish O. D.  
Finish Face.  
Finish 45° Chamfer.

#### Holding Method—

1st Operation—Chuck on inside diam.

2nd Operation—Chuck on ring on outside diam.

3rd Operation—Chuck on ring on inside diam.

Feeds—1st and 2nd Operations..... .008"

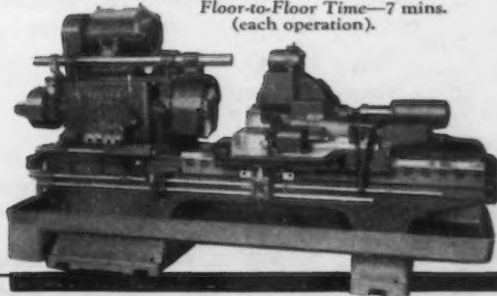
3rd Operation..... .012"

Speeds—1st Operation..... 193 r.p.m.

2nd and 3rd Operations..... 277 r.p.m.

Finish Accuracy—within .004".

Floor-to-Floor Time—7 mins.  
(each operation).



**INTERNATIONAL MACHINE TOOL CORPORATION**

FOSTER DIVISION, ELKHART, INDIANA • LIBBY DIVISION, INDIANAPOLIS, INDIANA

MAIN OFFICE AT ELKHART, INDIANA

FOSTER FASTERMATICS • LIBBY HEAVY DUTY TURRET LATHES • STANDARD TOOLS  
SUPERFINISHING MACHINES • BARKER CHUCKS • UNIVERSAL RAM TYPE TURRET LATHES

## Control Tightened on Excess Stocks

### Washington

••• To tighten control over materials, WPB last week amended Priorities Regulation No. 13, dealing with the sale of idle, excess or frozen materials by persons who are not regularly engaged in the business of selling such materials. One of the principal changes was to put various

government agencies, such as the War and Navy Departments, BEW and the Maritime Commission, and persons buying for their account, on the same basis as other users and purchasers. Previously the regulation provided that sales might be made freely to such agencies.

The change resulted from the fact that the general control of critical

materials is now more stringent than it was last July, when the regulation was first issued. Also, the regulation created an artificial distinction between manufacturers who work on government-owned materials and those whose product is made for the services, although ownership does not pass until the end product is delivered. This distinction now is removed. Sales to certain government corporations such as the Commodity Credit Corp., DSC, MRC, and Rubber Reserve Co., for stock-piling purposes still are permitted.

The revised regulation continues to allow sales to users on specified ratings except in the case of materials which are particularly scarce and where there is a close allocation, such as aluminum, chromium, several forms of copper, pig iron, nickel, steel rails, tin, vanadium, rubber, plywood, raw silk and various chemicals. Obviously, any manufacturing establishment operated by the Armed Services would have high ratings.

Reference to the sale of scrap has been omitted from the revised regulation since there are specific orders covering scrap in those cases in which one is considered necessary.

A provision has been added to the regulation authorizing the sale of any controlled material to fill an authorized controlled materials order. Before July 1, the effective date of the requirements that controlled materials be sold only on authorized CMP orders, the regulation will be further revised to conform.

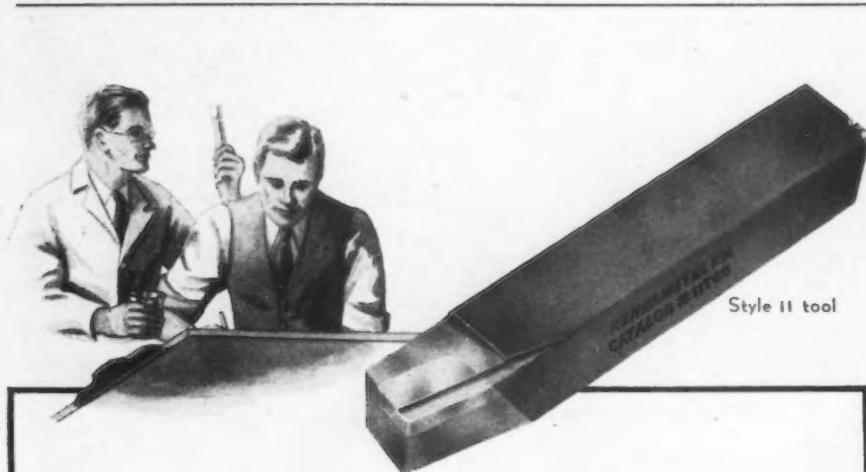
### Copper Order Modernized

••• Copper Order M-9-c was amended by WPB to make it conform to other WPB orders which have recently been amended. The amended copper order now prohibits the use of copper in fans, except as permitted by Order L-176; and in air-conditioning and refrigeration equipment, except as permitted by Order L-126 and L-38.

### 1545 Tons of Scrap to Come from 3 WPB Projects

Philadelphia

••• Dismantling of the knitting machinery of two hosiery plants and wrecking of a radio transmitter building are expected to yield more than 1545 tons of scrap, including some copper, brass and aluminum. All three projects are being handled by the Special Projects Salvage branch of the local WPB.



## THERE'S A KENAMETAL<sup>\*</sup> TOOL for your job

Metallurgists and tool engineers at McKenna Metals Company are producing carbide tools for greatest steel-cutting efficiency on your specific machining operation.

The steel-cutting industry is being supplied with more than 30 standard and typical styles of KENAMETAL tools, in several sizes and in four standard grades of hardness. Sizes and grades are available in standard styles for most applications of turning, boring, facing, milling, shaping, planing, cutting-off, or grooving.

If one of the many standard tools is not applicable to your job, KENAMETAL tools can be ordered with modifications which adapt them to unique applications, or KENAMETAL blanks can be ordered for your own tool making.

Write for your copy of catalog 43B for complete selection material on KENAMETAL carbide tools.

\* INVENTED AND MANUFACTURED IN U. S. A.





# McKENNA METALS Co.

144 LLOYD AVE., LATROBE, PA.

Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York  
(Exclusive of Canada and Great Britain)

Trade Mark Reg. U. S. Pat. Off.





No. 4 in a series showing why **"TOMAHAWK"** tools do a better job of both machining and helping the war effort.

## *All set to keep going-*

Even the best of Tomahawks require sharpening once in a while. When you've got a job requiring a rotary form tool and you want to keep that job going with the minimum of down time, it is not a bad idea to use, when possible, multiple-gashed carbide tipped forming tools like the **"TOMAHAWK"** tool above.

When one carbide cutting edge is dulled, a sharp cutting edge is restored by simply rotating the tool slightly. This type of construction is particularly effective in tools which are relieved (backed-off) to provide cutting clearance.\*

With multiple tipped single point carbide tools like this you can frequently eliminate as much as 90 per cent of your machine down-time for tool changes; you can cut the number of tools you have to carry in stock to keep the job running; you can save grinding time; and you can increase production per machine-hour.

\*Genesee Tool Company is one of the few tool manufacturers in the United States with a completely equipped back-off grinding department.

Write for "streamlined" condensed catalog of Genesee tools. Ask for catalog No. GT-42 M.

**GENESEE TOOL COMPANY**  
F E N T O N , M I C H I G A N



★ Registered Trade Mark

## Warehouse Extras Set on NE Alloys

• • • Extra charges that may be made by warehouses for alloy steels developed for war uses since April 16, 1941, and now employed in the aircraft industry are announced by OPA.

They are listed in Amendment No. 13 to Revised Price Schedule 49, effective April 15, 1943.

The extras that now may be added for the first time in the maximum prices of NE alloy steels are priced at the rate per 100 lb. They include \$1.25 for stress relieving after cold

working; \$2.50 for aircraft quality; and 40c. for the extensometer test.

At the same time a charge is permitted for treatment, such as heat treatment by a specialist, given the material at an outside plant; that is, at a plant not that of a producer or the seller. This charge is the actual invoice cost to the seller, minus any trucking charge included on the invoice, plus 30c. per 100 lb., provided that no additional charges may be made, such as for trucking, handling, or risk.

## Price Relief Made Available on Pig Iron

Washington

• • • Any producer of pig iron who is prepared to show that his cost of production is above his furnace net realization at maximum prices, or that his furnace net realization is inadequate in view of high operating costs for continued operations at maximum prices, may file a petition for adjust-

ment of or exception to the maximum prices established by Schedule 10 under Amendment 6 to the regulation, issued by OPA.

## Malleable Pricing Defined

• • • How sellers of products composed of malleable iron tell whether their products should be priced under the regulation for malleable iron castings or under some other price regu-

lation was defined Friday by OPA. The action is in Amendment 3 to 241 effective April 15, 1943. Neither action makes any change in current price levels.

## Price Adjustment Boards Issue New Statement Forms

Washington

• • • Price Adjustment Boards of the War, Navy, and Treasury Departments and the Maritime Commission last week issued new forms for financial and cost statements by war contractors with a view to expediting clearance under the renegotiation act. Any war contractor filing his figures on the form automatically will be cleared of obligation to submit to renegotiation unless requested to do so within a year after the filing.

The forms can be obtained through any of the four departmental Price Adjustment Boards, or by writing to Assignment Office, Price Adjustment Boards, P.O. Box 2707, Washington.

## Price Rise Permitted for Coke in Hardship Cases

Washington

• • • Upward adjustment of prices of beehive oven furnace coke produced in Pennsylvania and of by-product foundry and blast furnace coke under the hardship clause of the price control act is authorized by an amendment to Revised Price Schedule 29, announced last week by OPA. The adjustment will be allowed where the cost of production is above the oven net realization at maximum prices or when the oven net realization is inadequate in view of high operating costs of continued operations at maximum prices.

## Price Relief Set For Machinery Trades

• • • New methods for producers and suppliers of machinery and machinery services whose machinery products or services are essential to the war program to obtain price adjustments were announced by OPA in Amendment No. 78 to Maximum Price Regulation No. 136, effective April 10.

The applicant for adjustment must show that the maximum price of the item is at such a level that, taking into account the cost of the item, the profits position of the manufacturer and the nature of his business, output of the item is threatened or impeded.

The procedure for filing applications for adjustment has been simplified and decentralized.



**MUSIC WIRE.** Conforming to Government specifications (WD 1085—WD 1095). Stock sizes .004" to .180" dia.

All JOHNSON wire is laboratory controlled all the way from original steel to finished product.

**JOHNSON STEEL & WIRE CO., INC.**  
WORCESTER • MASSACHUSETTS.  
NEW YORK AKRON LOS ANGELES



### Canada Announces New Scrap Metal Ceilings

••• M. A. Hoey, associate Steel Controller, announced new maximum prices for cast iron scrap delivered f.o.b. railway cars or truck at basing points at Toronto, Windsor, Walkerville, Ont., and Montreal, Que.:

No. 1 cast iron	\$19.00
Flow points, chilled cast iron and white iron	18.00
Stove plate cast	17.50
Cast iron car wheels	19.50
Malleable iron	16.00

Maximum prices per ton for steel scrap delivered f.o.b. railway cars or trucks at consumers plant at basing plants are:

	Hamilton	Montreal
Mixed steel	\$15.50	\$15.50
Hydraulic bundles:		
No. 1 bundles	17.50	17.50
No. 2 bundles	17.00	17.00
No. 3 bundles	15.50	15.50
High silicon bundles	15.50	15.50
Mechanical bundles	15.50	15.50
Remelting rails	18.50	18.50
Re-rolling rails	21.50	21.50
Unprepared busheling	10.00	8.50
Busheling	13.00	12.00
Unprepared new factory busheling	11.50	11.50
New factory busheling	16.50	16.50
Mixed short steel turnings, borings	12.50	Not basing point
Short shoveling steel turnings	12.50	12.50
Chemical cast iron borings, cast borings for briquetting	15.00	10.50
Borings used for abrasives	14.00	9.50
Electric furnace bundles	20.50	20.50
Manganese steel	20.00	20.00

### Zone Pricing Explained at OPA-Warehouse Meeting

Philadelphia

••• A meeting with members of the heavy line iron and steel warehouse industry to explain specific maximum prices set for four eastern zones was held Tuesday by the OPA here in the Chamber of Commerce headquarters. Copies of the full schedule of ceiling prices for the iron and steel warehouse products in the four zones which is high lighted in this issue were discussed at the meeting.

### ICC Cuts Freight Rates

Washington

••• The Interstate Commerce Commission decision on Monday suspending freight rate increases that went into effect March 18 will be cut back in rates on iron and steel products, including pig iron and scrap of 6 per cent. The coal rate increase varied but on a ton basis was also 6 per cent and will be eliminated. There was no increase in rate on iron ore and sinter.

### More Plant Contracts Are Authorized by DPC

Washington

••• Defense Plant Corp., RFC subsidiary, has authorized the following contracts:

W. F. & John Barnes Co., Rockford, Ill., to provide additional plant facilities in Illinois at a cost in excess of \$300,000, making a total commitment of more than \$3,200,000.

Owens-Corning Fiberglas Corp., To-

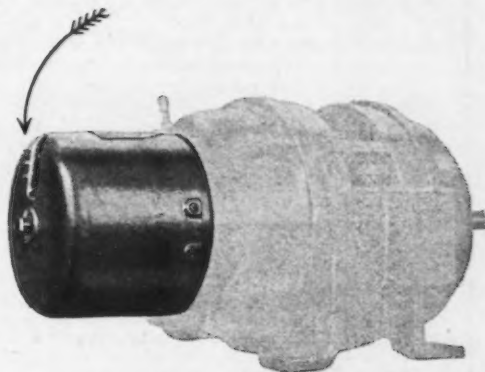
ledo, Ohio, to provide plant facilities in Pennsylvania at a cost in excess of \$1,600,000.

Bower Roller Bearing Co., Detroit, to provide additional equipment for a plant in Michigan at a cost in excess of \$460,000, making a total commitment of more than \$1,030,000.

Revere Copper & Brass, Inc., New York, to provide additional plant facilities in New York at a cost in excess of \$125,000, making a total commitment of more than \$835,000.

Lombard Iron Works Co., Augusta, Ga., to provide additional equipment for a plant in Georgia at a cost in excess of \$41,000, making a total commitment of more than \$130,600.

## DESIGN FEATURES *Stearns* MAGNETIC BRAKES



The telltale lining wear indicator and manual release (shown by the arrow) is original and distinctive with Stearns Magnetic Disc Brakes to make their operating condition clearly shown at all times, no guessing or hoping.

Numerous other outstanding features have been developed in our many years of efficient and economical applica-

tion of brakes, whether for floor or motor mounting.

Simple in design, rugged in construction, Stearns brakes are being satisfactorily used in thousands of varied installations that require smooth, fast stops. Built in a wide range of sizes, readily adaptable.

We invite your inquiry as pioneer designers of magnetic friction control devices. Write for Bulletin 604.

*Stearns*

**MAGNETIC MFG. CO.**

635 S. 28th St.

Milwaukee, Wis.

SEPARATORS DRUMS ROLLS  
CLUTCHES BRAKES  
SPECIAL MAGNETS

## This Week's Priorities and Prices

An alternative ceiling for used machinery and second-hand machine parts, which is based on standard depreciation rates and allows sellers in some instances to obtain higher prices than existing maximums is included in Amendment No. 76 to Maximum Price Regulation No. 136. (OPA-2142)

Brass and bronze alloy shot is added to Maximum Price Regulation No. 202 with the issuance of Amendment No. 3. (OPA-2169)

Producers and suppliers of machinery and machinery services whose machinery products or services are essential to the war program have been given new methods for obtaining price adjustments, under Amendment No. 78 to Maximum Price Regulation No. 136. (OPA-2166)

Sample quantities of steel for experimental purposes can be delivered to manufacturers or laboratories without regard to preference ratings or authorized controlled material orders. (WPB-3092)

Steel has been released for use in the manufacture of several kinds of civilian goods under an extensive revision of order M-126. (WPB-3090)

Pig iron price ceilings have been amended to provide

for specific exemptions from the ceiling prices in amendment No. 6 to Revised Price Schedule No. 10. Iron and steel warehouses may make the extra charges for NE alloy steels developed since April 16, 1941, listed in Amendment No. 13 to Revised Price Schedule No. 49. (OPA-2193)

Malleable iron castings are clearly defined in Amendment No. 3 to Maximum Price Regulation No. 241, and sellers are told how their products should be priced. (OPA-2199)

Copper and copper base alloys have been barred in the manufacture of electrical wiring devices in Order L-277. (WPB-3140)

Tin anodes may sell for a price above the ceiling placed on pig tin, according to Amendment No. 3 to Revised Price Schedule 17. (OPA-2202)

■ ■ ■

For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)

## Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of October 8 to bring the Guide up to date.

### Priority Regulations:

No. 8...Amended order eliminates requirements for reports on any of the 43 forms listed in Appendix A to that regulation (4-5-43).

No. 13...Amended order further tightens control over materials (4-6-43).

### "M" Orders:

M-45...Amended to eliminate reference to order P-76 (4-8-43).

M-126...Amended order releases limited steel supply for civilian goods (4-7-43).

### "P" Orders:

P-55-b...Amendment permits field agents to sign WPB construction permits (4-8-43).

P-58...Amended order sets up procedure for obtaining mining supplies (4-6-43).

P-65...Amended order assigns higher preference rating to deliveries of marine paint (4-9-43).

P-75...Revoked (4-8-43).

P-76...Revoked (4-8-43).

P-100...Revoked (4-5-43).

### "L" Orders:

L-97...Interpretation No. 2 states that order covers manufacture of locomotive parts needed to fulfill the prescribed schedule for the completed product (4-10-43).

L-157...Amended order permits manufacture of coal miners' picks (4-8-43).

L-170...Amendment changes farm machinery export quotas (4-8-43).

L-176...Amended order eases restrictions on repairs to electric fans (4-6-43).

L-193...Amended order imposes further restrictions on use of steel in continuous stream conduit elevator-conveyors (4-5-43).

L-217...Schedules order simplification of a number of models and sizes of seven types of bituminous road building machinery (4-5-43).

L-217...Amended order places restrictions on production of certain types of construction machinery (4-8-43).

L-253...Schedule A lists truck bodies exempt from provisions of order (4-6-43).

L-270...Order governs manufacture of automobile maintenance equipment (4-6-43).

L-277...Order bars use of copper and copper base alloys in electrical wiring devices (4-10-43).

## Trade Notes . . .

South Portland Shipbuilding Corp. has changed its name to New England Shipbuilding Corp. The management remains unchanged.

Reeves Pulley Co., Inc., Columbus, Ind., has announced appointment of R. X. Raymond as a representative, with offices in the Fawkes Building, Minneapolis.

Lincoln Electric Co., Cleveland, has moved its Duluth office to Room 200, Builders Exchange Building.

Dumore Co., Racine, Wis., recently marked its thirtieth anniversary.

Standard Mfg. Co., Corning, N. Y., has moved to its new plant in Big Flats, N. Y., and the name of the organization has been changed to Hungerford Corp.

Cleaver-Brooks Co., Milwaukee, has leased a factory building at 4253 North Port Washington Road to take care of expanded war production.

Eimco Corp. has established an additional complete filtration laboratory in connection with its Chicago office at 111 West Washington Street.

Detroit Tap & Tool Co., 8432 Butler Street, Detroit, is issuing stock record lists every 15 days indicating sizes and types of thread gages currently available.

General Electric Co. has appointed 18 industrial electronic specialists to help industry with electronic application problems. The specialists are: I. C. Diefenderfer and D. C. Hierath, New York; J. F. Getz, Philadelphia; A. J. Moore, Boston; W. B. Frackelton, Chicago; L. E. Donahue, Los Angeles; J. A. Setter, Denver; I. F. Conrad, St. Louis; A. D. Boardman, San Francisco; L. B. Parsell, Detroit; L. R. Elder, Portland, Ore.; Frank C. Neal, Jr., Dallas, Tex.; R. H. Jackson, Atlanta; K. H. Keller, Cleveland; R. C. Norris, Cincinnati; A. M. Dawson, Pittsburgh; B. Cogswell, Buffalo; and L. F. Stone, Newark, N. J.

Taylor Mfg. Co., Milwaukee, has purchased the plant of Wright Rubber Products Co., Racine, to use for manufacturing a general line of compressed plastics, laminated woods

and electrical insulating material. Mr. Wright will remain in an executive capacity.

Glyco Products Co., Inc., Brooklyn, has moved its administrative offices to 26 Court Street.

Meehanite Metal Corp. and the Meehanite Research Institute of America, Inc., have moved their headquarters from Pittsburgh to the Pershing Building, New Rochelle, N. Y.

Allegheny Ludlum Steel Corp., Brackenridge, Pa., has announced that Howard M. Givens, Jr., manager of tool steel sales will make his headquarters at the corporation's Dunkirk, N. Y., offices.

Electric Arc, Inc., Newark, N. J., is celebrating their silver anniversary. Established during World War I, the company is now engaged in war work for World War II.

National Tool Salvage Co., Detroit, has moved its plant and offices to 6511 Epworth Boulevard. The company was founded in 1912, and today is serving the metal working industry from Coast to Coast.



## Nelson Confident of 1943 Ore Traffic

Cleveland

• • • Confidence that the iron ore industry, the lake vessel industry and the railroad servicing industry will do all possible to meet the tentatively set quota of 95,000,000 tons for the 1943 Great Lakes iron ore movement was expressed by Donald M. Nelson this week. The 1943 goal is 3,000,000 tons more than the record set in 1942, and 15,000,000 tons more than were moved in 1941. Prior to 1941, the record was 66,000,000 tons, set in 1916.

The size of the task before the industry may be seen from the fact that an average of about 400,000 tons of ore must be loaded and shipped daily from the upper Great Lakes ports in an average season of 240 days to meet the quota. Aiding in the effort to meet the 1943 goal will be the addition of 16 new carriers to last year's 306-boat fleet. Half of the new ships are scheduled to be in operation by the end of this month, and the others after the season's mid-way mark is reached.

These new 14,000-ton vessels, which will make about four trips a month, probably will offset the fact that the season will open some three weeks later than it did last year. On the other hand, increases in the movement of other essential commodities also are called for this reason and will require greater tonnages of lake equipment.

One ship owned by Cleveland-Cliffs Iron Co. was expected to arrive at Cleveland Tuesday or Wednesday this week with ore.

### Aluminum Rod, Bar Orders Protected on Mill Schedules

• • • Users of aluminum rod and bar have been granted protection from displacement of their orders for these products in mill production schedules until May 1, under the terms of Direction No. 2 of CMP Regulation No. 1, the WPB announced this week.

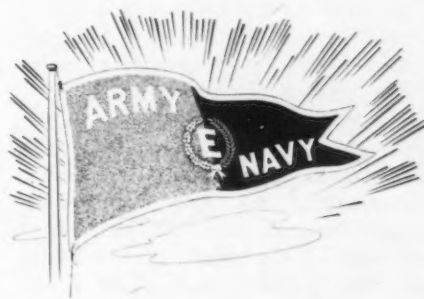
Until May 1, aluminum mills are required to hold all orders covered by authorizations for delivery of aluminum rod and bar in March, or earlier, in their present position on mill production schedules for April, May, and June, 1943. During the entire month of April, mills are directed to consider orders covered by any such previous authorization as if they were actually CMP authorized controlled

materials orders in determining the amount of other orders they may accept within the limits of a production directive. However, if the user of aluminum rod or bar fails to assign May or June CMP allotment numbers with proper certification to its orders before May 1, mills are directed to remove these orders from their production schedules.

### Brass and Copper Mill Schedules Protected by WPB

Washington

• • • Special directions under CMP Regulation No. 1 have been issued to copper wire mills and brass mills, stating that products approved by WPB for delivery during April may not be displaced in mill production schedules by any other orders, including authorized controlled materials orders, notwithstanding any provi-



### Cited for Award

• • • The following companies have recently been awarded the Army-Navy "E" for outstanding performance on war work:

General Electric Co., Bridgeport Works, Bridgeport, Conn.  
Philco Corp., Storage Battery Division, Trenton, N. J.  
Queen City Steel Treating Co., Cincinnati.  
Foote Brothers Gear & Machine Corp., Chicago.  
Farrel-Birmingham Co., Inc., Ansonia and Derby, Conn., and Buffalo plants (second star).  
Silent Hoist Winch & Crane Co., Brooklyn.  
Machlett Laboratories, Springdale, Conn.  
Columbian Vise & Mfg. Co., Cleveland.  
Kropp Forge Co., Chicago (second star).  
Morey Machinery Co., Inc., Astoria, N. Y.  
Donner-Hanna Coke Corp., Buffalo.

#### Maritime Commission "M"

John Lucas & Co., Inc., Gibbsboro, N. J.  
Paxton Mitchell Co., Omaha, Neb.  
Mine Safety Appliances Co., Pittsburgh.  
Fort Pitt Casting Co., McKeesport, Pa.  
Bethlehem Steel Co., Hoboken Yard, Hoboken, N. J., and Brooklyn-56th Street Yard, Brooklyn.

sions in CMP regulations, unless specific directions to the contrary are issued, WPB has announced. Direction No. 3 (copper wire mills), and Direction No. 4 (brass mill products) embody these instructions.

In the case of both brass mills and copper wire mills, the directions provide that where an order previously placed is converted into an authorized controlled material order the effective date of the conversion is the date on which the allotment number is received by the producer. Delivery of such orders may be refused if the allotment number is not received in accordance with time limits for placement of controlled materials orders as established in Schedule 3 of CMP Regulation No. 1.

### Truman to Investigate Freight Material Needs

• • • The Truman Committee investigating the national defense is stirred up over a fear of a breakdown in the transportation system. It announced that it is making an investigation and probably will make a report in two or three weeks concerning the situation with regard to the railroads, interstate and intrastate motor trucks and barges. The inquiry concerns the need for new machinery and equipment and repairs for the rail carriers, additional truck and repair parts for those now in operation and more barges and repairs for those now in service.

### Unfreezing to Aid Freight Car Program

• • • Sufficient railroad car truck sideframes and bolsters will be available to meet the production schedules set up for the new freight car building programs covering military and civilian needs, if such materials which were frozen in inventories about a year ago are put to use, it was indicated last week at a meeting of the Railroad Specialty Steel Castings Industry Advisory Committee in Washington. Current production, alone, it was brought out, would be inadequate unless there was a material improvement in the manpower situation.

The Transportation Equipment Division, WPB, is now working for the release of the surplus stocks in inventories to make them available.

## Shipbuilders Take Largest Share Of Steel Industry Shipments in 1942

••• In 1942, for the first time on record the shipbuilding industry took rank as No. 1 consumer of steel, according to reports of steel shipments from companies which produced 95 per cent of the total steel output in 1942, the American Iron & Steel Institute reported this week.

During the year, a total of at least 9,425,000 tons of steel products was sent to shipbuilders for fabrication into ships for the Navy and the merchant marine.

That tonnage, which does not include several hundred thousand additional tons of steel provided to shipyards for the construction of shipyards, shipways and buildings, represented almost 16 per cent of the total tonnage of products shipped by steel plants to all classes of consumers during the year.

Throughout the year, shipments of steel to shipbuilders represented an increasingly large proportion of total shipments. In December, 1942, fully one out of every five tons of products leaving the plants of steel producers was destined for one of America's shipyards.

The amount of steel sent to shipbuilders in the past three years has shown a spectacular increase. In 1940, approximately 940,000 tons of steel, or 2 per cent of the total, went into shipbuilding, while in 1941 shipyards received 2,733,000 tons, or 4 per cent of the total.

For military reasons, shipments of

steel for direct war purposes in 1942 cannot be revealed separately and are largely lumped under the heading "miscellaneous industries and export." That category covered shipments of 14,848,000 tons of steel products in 1942, or almost 25 per cent of total shipments.

Ranking second to shipbuilding among individual steel-consuming industries in 1942 was the construction industry, which received a total of 8,656,000 tons—14 per cent of the total.

Both in tonnage and percentage of total, the construction industry stood slightly higher in 1942 than in the year before. The trend at the close of the year was downward, however.

Jobbers, dealers and distributors of steel constituted the third largest single outlet for steel in 1942, but held first place the year before. About 10 per cent of the total tonnage shipped during 1942 went to jobbers, compared to nearly 15 per cent in 1941.

A total of 4,318,000 tons of steel was shipped to the railroad industry during 1942. That tonnage was about 7 per cent of the total, which compares with 9 per cent going to the railroads in 1941.

Container manufacturers, chiefly those making "tin" cans, received 3,666,000 tons of steel last year, or 6 per cent of the total. In 1941 the container industry took about 7 per cent of all steel.

Manufacturers of machinery and

tools received 2,539,000 tons of steel products, 4 per cent of the total during 1942—virtually as much both in tons and percentage as that industry received in 1942.

The automotive and aircraft industries together received 2,122,000 tons of steel last year, 3½ per cent of the total. Because no automobiles, except for a limited number of trucks essential for the war program, were produced last year, the tonnage of steel consumed in 1942 by automobile and aircraft manufacturers, was only about one-third of the 1941 total. Although it cannot be shown separately, the tonnage of steel which went to aircraft producers in 1942 was roughly three times the 1941 tonnage.

The tonnage of steel going to other principal industrial classifications in 1942 was: Steel converting and processing industries, 4,293,000 tons; pressing, forming and stamping industry, 2,717,000 tons; railroad industry, 4,318,000 tons; oil, natural gas and mining industry, 1,325,000 tons; agricultural industry, including implement and equipment manufacturers, 570,000 tons.

Shipments of a total of 60,440,000 tons of products were shown by the reporting companies

### Details Revealed on British Locomotive

••• Details of the new "Austerity" 0-6-0 saddle tank locomotive designed in Britain have been revealed. Cylinders inside drive the second axle, and slide valves between cylinders are operated by hand-controlled Stephenson links. Driving wheel centers are cast iron with hard steel crank pins pressed in. Steel castings are reduced to a minimum.

The boiler is simply designed and is without superheating. The round-topped fire-box and the water space stays are copper. Tubes are steel and special provision is made for washing out, to enable the boilers to be kept clean, even with bad feed water. Main dimensions of the locomotive are:

Cylinders (2) diameter..	18 in.
Piston strike .....	26 in.
Coupled wheels, diameter .....	4 ft. 3 in.
Wheel base, rigid .....	11 ft.
Heating surface	
Tubes .....	872½ sq.ft.
Fire-box .....	87½ sq.ft.
Total .....	960 sq.ft.
Grate area .....	16.8 sq.ft.
Boiler pressure .....	170 lbs. per sq.in.
Tank capacity .....	1200 gal.
Coal capacity .....	2¼ tons
Tractive effort—	
At 85% B.P. ....	23,870 lb.
At 75% B.P. ....	21,060 lb.

Total weight in working order ... 48 tons 4 cwt.

**WEEKLY MEETING:** Here's the Combined Munitions Assignments Board, meeting in Washington with Chairman Harry Hopkins. Seated at the conference table clockwise are:

Maj. Gen. L. D. Clay, Hopkins, Maj. Gen. J. H. Burns, Lt. Col. E. C. Kielkopf, Wing Comdr. T. E. H. Birley (British), Brig. Gen. W. F. Tompkins, Brig. S. P. Spalding, Brig. L. F. S. Dawes (British), Air Vice-Marshal W. F. MacNeece Foster (British), Lt. Gen. G. N. Macready (British), Maj. Gen. R. C. Moore, Col. J. B. Franks, Adm. J. M. Reeves, Vice-Adm. J. W. S. Dorling (British).

In the background, left to right, are Lt. Col. J. F. R. Seitz, Col. F. Y. York, Jr., Col. W. R. D. Robertson (British), Col. C. M. Steese, Maj. W. M. Martin, Jr., Col. W. H. Hobson, Maj. A. Selbie (British), Brig. Gen. P. H. Tansey, M. Michaels (British), and Lt. Col. W. Skidmore.





## Ingot Mark Shattered; Other Records Are Made

••• March steel ingot production at 7,670,187 net tons shattered the all-time monthly tonnage peak established last October, according to the American Iron & Steel Institute. The new record may be short-lived, however, for all signs point to sustained high output this Spring.

Steel plate production in March reached an all-time high. Total shipments by all types of mills last month were 1,167,679 net tons, compared with the previous record of 1,135,413 net tons shipped in January, 1943.

Shipments last month to Maritime Commission yards were approximately 500,000 tons. Other war agencies shared heavily. More than 400,000 tons were produced for the Army and Navy. Plate shipments of continuous strip mills amounted to 563,302 net tons. Shipments by sheared mills also reached a new high mark of 465,572 net tons. Shipments by universal mills were 138,805 net tons. Ninety mills, operated by 33 companies, are now producing plates. These include 32 strip mills, 32 sheared plate mills and 26 universal plate mills.

The Ford Motor Co. steel mill broke all its production records last month by turning out 71,392 tons. The open hearths

produced 67,584 tons and the electric furnaces 3808 tons.

During March, two new all-time Republic Steel Corp. records were set, one in coke production and the other in pig iron production.

Coke production of 464,233 tons shattered the previous high of 416,415 tons made in January, 1942. Pig iron hit the new high of 502,587 tons as compared with the last October's record of 482,265 tons.

Shipments of finished steel products by United States Steel Corp. in March totaled 1,772,397 net tons, an increase of 80,805 net tons over February. First quarter shipments were 5,149,982 net tons, highest for that period in the history of the corporation.

### YEAR 1942

Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated* weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons*	Percent* of capacity	Net tons*	Percent* of capacity	Net tons*	Percent* of capacity	Net tons*	Percent* of capacity		
January.....	6,322,215	95.3	490,874	86.0	299,017	94.2	7,112,106	94.5	1,605,442	4.43
February.....	5,785,918	96.6	453,549	88.0	273,068	95.2	6,512,535	95.9	1,628,134	4.00
March.....	6,572,930	99.0	493,191	86.4	325,990	102.7	7,392,111	98.2	1,668,648	4.43
1st Quarter.....	18,681,063	97.0	1,437,614	86.7	898,075	97.4	21,016,752	96.2	1,634,273	12.86
April.....	6,345,133	98.7	454,834	82.2	321,324	104.5	7,121,291	97.7	1,659,975	4.29
May.....	6,595,440	99.4	453,938	79.5	333,200	104.9	7,382,578	98.1	1,666,496	4.43
June.....	6,239,674	97.1	452,528	81.8	323,100	105.1	7,015,302	96.3	1,635,269	4.29
3rd Quarter.....	19,176,057	98.4	1,343,307	82.7	847,624	99.7	21,366,998	97.6	1,668,872	12.86
4th Quarter.....	19,593,840	99.4	1,395,570	82.4	1,074,435	98.9	22,063,845	96.2	1,679,137	13.14
2nd 6 months.....	38,640,647	98.0	2,754,510	81.3	2,098,841	98.6	43,493,998	96.8	1,655,653	26.27
Total.....	76,501,957	97.9	5,553,424	82.6	3,974,540	99.8	86,029,921	96.8	1,649,979	52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942, as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,519 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,509,714 net tons open hearth, 128,911 net tons Bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, Bessemer 6,721,400 net tons, Electric 4,225,890 net tons.

\* Revised January through December, 1942.

### YEAR 1943

Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated* weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons*	Percent* of capacity	Net tons	Percent of capacity	Net tons*	Percent* of capacity	Net tons*	Percent* of capacity		
January.....	6,576,589	97.8	478,058	85.9	369,395	95.4	7,424,042	96.8	1,675,856	4.43
February.....	6,033,674	99.3	447,843	89.1	344,532	98.6	6,826,049	98.5	1,706,512	4.00
March.....	6,785,295	100.9	503,673	90.5	381,219	98.5	7,670,187	100.0	1,731,419	4.43
1st Quarter...	19,395,558	99.3	1,429,574	88.4	1,095,146	97.5	21,920,278	98.4	1,704,532	12.86
April.....										4.29
May.....										4.43
June.....										4.29
4th Quarter.....										13.14
2nd 6 months.....										26.27
Total.....										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,360 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943 as follows: Open hearth 79,180,880 net tons, Bessemer 6,553,000 net tons, electric 4,554,980 net tons.

\* Revised January through February, 1943.

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# PERSONALS

• **W. J. O'Neil**, president and general manager of Dodge division of Chrysler and general manager of Dodge Chicago plant, has resigned and is replaced by **Herman L. Weckler**, vice-president and general manager of Chrysler Corp. **F. J. Lamborn**, formerly vice-president in charge of manufacturing for Dodge, was made vice-president and general manager. **L. L. Colbert**, operating manager of Dodge Chicago, has been appointed general manager of that plant. **Wayne H. Eddy** has been appointed production manager of the Dodge Chicago plant of Chrysler Corp. He has been president of the Production Planning Co. of Detroit. In 1940 he supervised construction and operation of the American Propeller Corp., Toledo subsidiary of Aviation Corp.

• **J. E. McFate** has been appointed manager of tubular sales, Republic Supply Co., Houston. Mr. McFate was formerly connected with the pipe division of Republic Steel Corp. at Tulsa, Okla.

• **Charles R. Stevenson** has been elected to the board of directors of the Autocar Co., Ardmore, Pa., succeeding **W. W. Colpitts** who had resigned. In addition, **Harold R. Baxter** was elected to the board, increasing the number from 11 to 12.

• **D. W. Champlin** has been elected a director of the Toledo Scale Co. Mr. Champlin is vice-president and general manager of the Defiance Machine Works, Inc., Toledo Scale Company subsidiary at Defiance, Ohio.

• **George R. Atkins** has been named manager of the branch sales office and factory in Akron, Ohio, of the Bristol Co., Waterbury, Conn. Mr. Atkins joined the Bristol Co. sales organization in 1929, starting work in the New York office.

• **H. C. Deckard**, a veteran of the aviation industry since World War I, has been made division manager of two divisions of the Aviation Corp., the Republic Aircraft Products Division in Detroit and the Northern Aircraft Products in Toledo. From 1924 to 1928 he was general superintendent of Taft-Peirce Mfg. Co., where he had charge of supplying the original tooling for manufacture of radial air cooled aircraft engines. Later he was with Fairchild Aircraft Corp. where he was responsible for factory and engineering functions on production

of engines and Fairchild airplanes. Previous to his present appointment he was handling special production assignments at the Ford Willow Run plant on output of Consolidated B-24 Liberators.

• **Lawrence M. Mank** has been named purchasing agent of G & A Aircraft, Inc., Willow Grove, Pa.

• **C. O. Hedner**, manager, hoisting equipment section, Yale & Towne Mfg. Co., Philadelphia, has been elected chairman of the Electric Hoist Manufacturers Association. **Sydney Buckley**, president and general manager, Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., has been elected vice-chairman.

• **H. L. Trembicki** has been named manager of the newly organized wire coating division of the Magnus Chemical Co., Inc., Garwood, N. J.

• **R. H. Knipping** has joined the Power Specialty Co. of Houston, Tex. He will shortly take over the San Antonio, Austin and Corpus Christi territory which he covered some years ago.

• **R. J. Rowen** has been named manager of the Wheeling district of Air Reduction Co. Mr. Rowen was one of the pioneers with Air Reduction, having started in 1916 as a shipping clerk in the distribution department at Philadelphia.

• **Roy B. Rose** has been named district manager for H. K. Porter Co., Inc., Pittsburgh, for a territory including eastern Pennsylvania, western New Jersey, Maryland and Delaware. He will be headquartered in Philadelphia, where the company will open offices in the Girard Trust Bldg. Mr. Rose is an executive of the company's Process Division.

• **Charles Belknap**, chairman of the executive committee and executive vice-president of Monsanto Chemical Co., has been elected president. **Edgar M. Queeny**, for the last 15 years president, was elected chairman of the board, a position vacant since the death of his father, John Francis Queeny, founder and first president of the company, in 1933.

• **Roy E. Kunde** has been appointed to the newly-created post of district traffic manager of the Bethlehem Steel Co., Lackawanna, N. Y. Formerly he was traffic representative of Bethlehem Supply Co., Tulsa, Okla., and assistant to the district traffic manager at Chicago.

• **Lester B. Chirgwin** has been appointed general manager of the Buffalo plant of the Farrel-Birmingham Co. Mr. Chirgwin is a graduate of the Sheffield Scientific School of Yale University and has been with the Farrel-Birmingham organization since 1914. He has been assistant manager of the Buffalo plant since 1928.

• **E. L. Zapp**, formerly with the Hyatt Bearings Division, General Motors Corp., and later with Henry Disston & Sons, Inc., Tacony, Philadelphia, has joined the Tube Reducing Corp., Wallington, N. J., in charge of metallurgical problems, with **R. Heinzerling** assisting.

• **William J. Norman** has been appointed assistant district manager of the Waverly plant in Newark of the United States Steel Supply Co., United States Steel Corp. subsidiary, and **Walter P. McGuire** has been named manager of the Philadelphia sales office. Mr. Norman who has been a salesman for the company since December, 1939, was first employed by the United States Steel Corp. in 1912. At the conclusion of the last war, Mr. Norman was employed by the Federal Shipbuilding & Drydock Company in Kearny, N. J., and after a short time was transferred to the United States Steel Corp. office in New York.

• **John R. Sargent** has been made acting manager of the market development department of the Westinghouse Electric & Mfg. Co. He was formerly the company's Eastern district market development representative and succeeds **Donald C. Hooper**, who is on active duty in the U. S. Navy.

• **R. B. Nuckols** has been appointed sales manager of the Standard Tool Co., Cleveland. Mr. Nuckols has been associated with the company for 24 years as a salesman with headquarters in St. Louis and subsequently as assistant sales manager.

• **Gilbert L. Dannehower**, has been appointed sales manager of Swiss American Gear Co., Jersey City. Mr. Dannehower will also manage the sales of Cosa Corp., Chrysler Building, New York.

• **John L. Collyer**, president of the B. F. Goodrich Co., has been named a member of the National Industrial Information Committee governing board.

• **Virgil M. Wall** has been appointed assistant sales manager for National Cast iron Pipe, division of James B. Clow & Sons, Birmingham. Mr. Wall



was transferred to Birmingham from National's branch office at Los Angeles where he was in charge of sales.

• **Hugh Acook**, formerly in the Tulsa territory, has been named Texas district manager of Wheelco Instruments Co., Chicago, with headquarters in Houston. **C. H. Garrison** has been named Kansas City representative, with a territory including western counties of Missouri. **Russell George** has been added to the sales and service department of the company's combustion safeguard division, with headquarters in Chicago.

• **Roy M. Smith** who joined the Roller-Smith Co., Bethlehem, Pa., in August, 1942, as assistant chief engineer has been appointed chief engineer, succeeding **J. D. Wood**, who has resigned. Mr. Smith went to Roller-Smith from the Bryant Electric Co., where he was engineering manager for the wiring device division. Prior to this, he was with the Westinghouse Electric & Mfg. Co. as section engineer on relay design and application.

• **T. Laurence Strimple** has been promoted to secretary of the National Acme Co., Cleveland, succeeding **George J. Steinbricker**, who continues as treasurer and serves also as a member of the newly created finance committee. He also serves as office counsel in company negotiations of war contracts with the government.

• **W. M. Wood**, for 25 years president of the Mississippi Valley Structural Steel Co., has been elected chairman of the board, and **R. D. Wood**, for the past 20 years a vice-president, has been elected president.

• **George D. Keller** has resigned as vice-president of the Studebaker Corp., South Bend, Ind. Mr. Keller has left for an extended vacation and at present his plans for the future are indefinite.

• **Harry J. Leddy** and **John E. Rovensky** were recently elected directors of Shippers' Car Line Corp. All other directors were re-elected for another year.

• **R. X. Raymond**, a gear sales engineer associated with the D. O. James Mfg. Co., Chicago, for 15 years, is now in charge of their Minneapolis offices.

• **John Rosevear** has been appointed manager of the Westinghouse Lamp Division Fairmount, W. Va., works. Mr. Rosevear formerly held the position of staff assistant in the industrial

engineering and equipment department of the Lamp Division with headquarters in Bloomfield.

• **James C. Hart**, formerly executive vice-president of the Federal Machine & Welder Co., Warren, Ohio, has been elected president of the Taylorcraft Aviation Corp. **Richard H. Depew, Jr.**, has resigned as executive vice-president and general manager and is now manager of special projects at Fairchild Aircraft, Hagerstown, Md.

• **Douglas H. Loukota**, formerly sales manager, has been appointed to the new position of director of sales and new development, Cannon Electric Development Co., Los Angeles. Succeeding Mr. Loukota as sales manager is **William V. Brainard**, formerly Cannon representative for the Northern California district.

• **C. J. Bickler** has been appointed assistant to the vice-president in charge of sales of the Globe Steel Tubes Co., Milwaukee. Mr. Bickler was formerly sales manager of the Cleveland District.

• **Francis Trecker** has been appointed secretary of the Kearney & Trecker Corp., Milwaukee. He joined the firm in 1939 as a Sales Engineer.

• **Charles E. Brinley** has been elected to the newly created office of chairman of the board of the Baldwin Locomotive Works. Mr. Brinley, who has served as president of the company since January, 1939, will remain as chief executive officer. **Ralph Kelly**, executive vice-president since 1942, was elected president.

• **Wayne H. Eddy** has been appointed production manager of the Dodge Chicago Plant, division of Chrysler Corp. Mr. Eddy has specialized in planning and production for many years. Prior to his association with the Dodge Chicago plant, he was president of the Production Planning Co. of Detroit.

• **Robert C. Allen** has been appointed manager of the Allis-Chalmers steam turbine department, succeeding the late **Arthur C. Flory**. Mr. Allen joined Allis-Chalmers in 1936 and became the steam turbine department's chief engineer in 1942, when he was also given the title of assistant manager.

• **Mims Hutchings**, who has resigned as state purchasing agent for Alabama, has been appointed to the newly created position of manager of purchases and stores of the DeBardeleben Coal Corp., Birmingham. Serving as purchasing agent for DeBardeleben from 1923 to 1939, Mr. Hutchings left the company to accept the post of state purchasing agent under former Gov. Frank M. Dixon.

## OBITUARY...

• **Howard C. Marmon** died at Fort Lauderdale, Fla., April 4, aged 66 years. From 1902 to 1936 Mr. Marmon was associated with Nordyke & Marmon Motor Car Co. at Indianapolis, manufacturers of the Marmon automobile. The company, now defunct, was founded by Mr. Marmon's father.

• **Harry Herbert De Loss**, a director of Handy & Harman, New York, died March 28. He was treasurer of the company from 1905 to 1915, vice-president 1915-1923 and a director from 1905 until his death.

• **L. Fred Iverson**, purchasing agent of the Sealed Power Corp., Muskegon, Mich., since 1935, died at his home on March 17, aged 61 years. In 1922 Mr. Iverson became general manager of the Replacement Division of Sealed Power and served in that capacity until 1935 when he became purchasing agent.

• **Arthur Livingstone Kimball**, research physicist and consulting engineer of the General Electric Co., died March 20 at his home in Schenectady, N. Y., of a heart attack. He was 57 years old.

• **Gustave M. Pflugradt**, founder and president of the Pflugradt Air Conditioning Co., Milwaukee, died suddenly of a stroke at his home there on March 21. He was 82 years old. In 1889 he established the Pflugradt Bros. Co. in Milwaukee with his brother, Charles.

• **Garcia D. Ingells**, 49 years of age, manager of the export tractor division of the Allis-Chalmers Mfg. Co., Milwaukee, and recently advertising manager of the department, died at Muskegon, Mich.

• **Walter Fernekes**, Milwaukee accountant who served for many years as secretary and treasurer of the Gemco Mfg. Co., and treasurer of the old Star Cast Aluminum Co. at Milwaukee, died at his home March 20 after a long illness.

• **William V. Higgins**, former European sales manager of the Gillette Safety Razor Co. and more recently a general partner of a Boston stock exchange house, died April 2, in a Lawrence, Mass., hospital. He was 47 years old.

• **Leroy F. Hamilton**, for many years an executive of the United States Steel Corp., died at North Harwich, Mass., March 29. He was 68 years old.

# MACHINE TOOLS

... Sales, Inquiries and Market News

## War Material Changes Lift Tool Market

Cleveland

••• The day to day routine in the machine tool industry, while it has been hectic for the past three years, now indicates to some builders and dealers that there are some major war materiel changes in the wind. While there is as yet little or no tangible evidence of such change, talk over the lunch tables seems to take the trend of "What do you think is coming, and how soon will it hit?" The growing feeling that there is something definitely in the wind may be exaggerated because it is an unknown factor, but some observers feel that the change-over will be as severe if not more so than that back in December and January when a major part of the armament program was cut back and the emphasis was placed on shipbuilding and aircraft.

There is the general feeling that again the aircraft program will be paramount, but what is not known is how far such a revised program will

carry the machine tool industry. Of course it is known that new types of ships are in the drawing board stage, some are in the experimental construction stage, and the new heavy bombers are actually in the production stages at some points, but what is not known is how much more aircraft building capacity will be added to take care of these new prototype designs which will go into production.

Also, there is the feeling that a general switchover in the types of guns that will be manufactured will be made, but here again there is the question in the minds of machine tool builders as to how much re-tooling will be necessary.

Perhaps, with backlogs being worked off, this is sort of wishful thinking on the part of machine tool builders, but the state of flux that the every day routine of business is in now substantiates in the dealers' and builders' minds at least that another major change is in the wind for armament production.

## Aircraft Bolt Shortage Acute

Cleveland

••• While there is an acute shortage of specific component parts used in machine tool construction, such as anti-friction bearings, steel tubing, alloy steels and forgings, there is also another shortage in another direction that is becoming daily more acute and is already reported to be holding up airplane production. That shortage is in precision bolts, nuts, and washers. Builders of parts and sub-assemblies for airplanes are having a difficult time in getting the precision made bolts and nuts, and one producer of wing sections is reported to have substantial stocks of wing sections that cannot be shipped to aircraft assembly plants because certain types of bolts are needed to complete the units.

Heretofore, large bolt and nut manufacturers went after quantity business such as automotive. The highly precision types ordered were usually limited in quantity and left to the smaller manufacturers. Consequently, with the huge demand for Class III and IV bolts and nuts, large manufacturers were not set up to han-

dle the load. It involved what was almost to the manufacturer an entirely new line of products. New equipment was necessary and new techniques in manufacture had to be evolved. While much of this conversion has taken place, production has nowhere near kept up with demands, and nuts and bolts are on the shortage lists of many expeditors for plants building aircraft sub-assemblies.

## Subcontracts Sought To Keep Machines Busy

Cincinnati

••• Steady all-out operations in the district machine tool plants continue to be the order of the day, even though in some instances prime contractors are accepting subcontracting work in their own plants. Several of the large machine tool builders with special types of machinery on hand which is not kept constantly in production for its prime orders have been seeking and receiving subcontracting from other plants, despite the fact the original producer is already sub-

contracting large portions of its own business.

Other problems of management show relatively no change, although renegotiation of contracts seems to have taken somewhat of a back seat in recent weeks. Manufacturers have looked with keen interest to the east where a number of renegotiations were reported to have been concluded, but the final results are not announced by Washington. In some quarters, the delay is looked upon with a degree of optimism.

The overall picture on new business shows relatively no change, with the flow of new business at a level usually quoted by manufacturers as "satisfactory."

## Gear Advisory Group Named

••• Members of the Gear and Speed Reducer Industry Advisory Committee announced April 10 by WPB are:

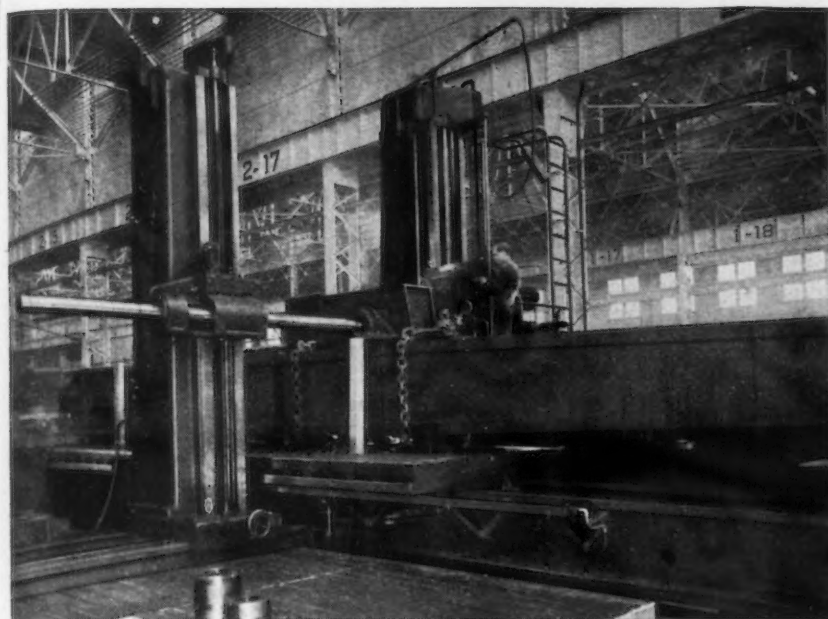
Russell C. Ball, Philadelphia Gear Works, Philadelphia.  
Thomas J. Bannan, Western Gear Works, Seattle.  
Louis R. Botsai, Westinghouse Electric & Mfg. Co., Pittsburgh.  
H. Browning, Ohio Gear Co., Cleveland.  
Rodney Davis, Rodney Davis & Co., Philadelphia.  
D. W. Diefendorf, Diefendorf Gear Corp., Syracuse, N. Y.  
Howard Dingle, Cleveland Worm & Gear Co., Cleveland.  
J. E. McBride, Palmer-Bee Co., Detroit.  
Robert B. Molr, Foote Brothers Gear & Machinery Co., Chicago.  
C. J. Morrin, Boston Gear Works, North Quincy, Mass.  
T. F. Scannell, Falk Corp., Milwaukee.  
R. B. Tripp, Ohio Forge & Machinery Corp., Cleveland.

## Curtiss-Wright Corp. Propeller Plant Enlarged

••• America's largest and probably most completely conveyORIZED propeller plant—the giant, newly enlarged factory of Curtiss-Wright Corp.'s Propeller Division in Indiana—is in full operation, geared for high-speed production.

Innovations which help it speed up production include a slat conveyor which extends hundreds of feet, along which employees work side by side assembling gears and cuffs to the propeller blades before final assembly; a paint shop which automatically controls mixing and distribution of paint and in which blades and other parts are carried through spray booths and drying ovens by means of conveyors; and a belt conveyor which eliminates all trucking in the hauling of cuff parts.





(Above) Boring  $10\frac{1}{8}$ " Dia. Hole in Gear Case of Boom

## 10 Operations Completed in 3 Settings of Shovel Boom... Wgt. 32,000 Lbs.



(Above) 32,000-lb. Welded Steel Boom

Manufacturers of heavy cumbersome equipment can use the versatility of G & L machines to good advantage. The variety of available operations such as boring, drilling, milling, facing and tapping often makes it possible to perform numerous operations in one setting. Lost time in moving the part to other machines and resultant inaccuracies are eliminated.

In this installation a 48-ft. long welded steel shovel boom is machined completely in only three settings. Ten operations, including milling, boring, facing and drilling, are performed.

Since the machine table is 25 feet shorter than the shovel boom, great care is exercised in setting it up for machining. All strains of overhang are shimmed out, while ends are supported by jacks. The job is then bolted to the machine table and jacks removed.

G & L machines are being used for unlimited machining operations on both small and large parts in many industries. With G & L attachments and accessories there is practically no combination of operations that cannot be performed with great speed and economy. Feeds and speed ranges cover all metals, and practically any cutting requirements.

G & L engineers will be glad to make recommendations for faster machining of your work on present or new G & L equipment. They are at your service without obligation.

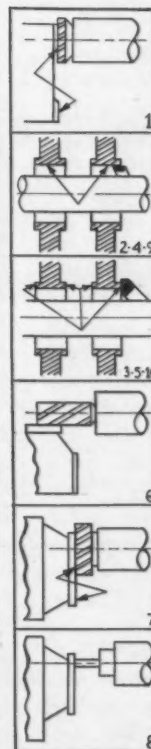
## How To Machine Large Parts...

*in fewer settings!*

### Versatility:

#### FOR PROPER MACHINING SEQUENCE AND FEWER SETTINGS

Proper machining sequence is available through ample feeds and speeds and versatility of G & L machines. The ten operations on the shovel boom are shown below:



#### FIRST SETTING:

**OPERATION 1**—Mill eight pads for set-up purposes on Operation No. 7.

**OPERATION 2**—Bore two  $10\frac{1}{8}$ " diameter bores in gear case. (3 cuts, rough, semi, and finish.)

**OPERATION 3**—Face and back face both sides of bores.

**OPERATION 4**—Bore two 8.377" holes for intermediate gear shaft.

**OPERATION 5**—Face and back face both sides of bores.

**OPERATION 6**—Mill strip on top face of gear case for alignment purposes in Operation No. 7.

#### SECOND SETTING:

BOOM ROLLED OVER 90° AND PARALLELS PLACED UNDER PADS MILLED IN FIRST OPERATION

**OPERATION 7**—Mill top of gear case.

**OPERATION 8**—Drill twenty-two  $1\frac{1}{16}$ " holes in gear case cover flange.

#### THIRD SETTING:

BOOM TURNED AT ANGLE OF 39° 14' 17" TO CENTER LINE OF SPINDLE

**OPERATION 9**—Bore two  $5\frac{1}{2}$ " holes for worm drive.

**OPERATION 10**—Face and back face both sides of bores.

## GIDDINGS & LEWIS MACHINE TOOL COMPANY

136 DOTY ST., FOND DU LAC, WISCONSIN



*Free Data*

Information covering the complete line of G & L machines and time-saving attachments and accessories is included in this catalog. Write for your copy. Ask for Catalog No. 43.



# NON-FERROUS METALS

... Market Activities and Price Trends

## Commission Favors Aid for Tin Workers

La Paz

••• The Joint U. S.-Bolivian Commission, which recently completed an investigation of conditions in Bolivia's tin mining districts, has recommended that the government restore labor's rights of free association and collective bargaining and has outlined a program for improvements in workers' wages, housing, health and education. Complete text of the report will not be released for some weeks, but *La Razón*, La Paz morning newspaper owned by the Aramayo mining interests, has summarized its principal provisions on the basis of information from "reliable, though unofficial" sources. They include:

- 1) Raising minimum wages; 2) Shortening working hours, which extend from sun-up to sun-down in some mines; enforcement of the labor code recently drafted by Remberto Capriles Rico and Gaston Arduz of the Labor Ministry; 3) Lowering the illiteracy rate by increasing the number of teachers, raising their wages and improving their qualifications with the help of the U. S. Office of Education; 4) Guaranteeing the right of labor to organize and bargain collectively, a right forcibly denied in recent months; 5) A social security system; 6) Public employment offices to replace the present system of labor hiring, under which employment agents travel through rural districts recruiting labor for the mines with extravagant promises of high pay. The agents' commissions are later deducted from the miners' wages; 7) Housing projects in the mining areas; 8) Health improvements and a change in workers' diet to do away with the widespread practice of chewing cocaine leaves; removal of customs duties on imported food for mining areas; extension of sanitation services, exchange of medical experts with the U. S. and an increase in the number of doctors (at present there are only 425 in Bolivia).

The Bolivian members of the Commission signed a supplementary memorandum recommending an increase in the price paid by the U. S. for Bolivian metals. All sections of the Bolivian public are now in agreement on the need for price increases,

although the South American Journal in London recently reported that British investments in Bolivian tin properties paid 31 per cent dividends in 1942. The solution, in the opinion of Bolivian members of the Commission, is for the U. S. to earmark part of any price increases for improving labor welfare. A certain part of the increase should be paid to the mine-owners to insure their cooperation. The welfare funds would be administered by a joint body of Bolivians, including representatives of labor, the mineowners and the Ministry of Labor.

## Procedure in Obtaining Aluminum Castings Outlined

Cleveland

••• In a special bulletin published by the National Bronze & Aluminum Foundry Co., Cleveland, manufacturers of permanent mold and sand aluminum castings, a careful analysis of procedures to be followed to obtain aluminum castings after May 1, 1943, is given. On March 15, WPB issued directive No. CMPL-120, which affects all aluminum producers, smelters, and foundries, eliminating practically all preceding instructions and substituting new procedures to be followed.

Form PD-26-a will no longer be used, and this supersedes all previous instructions, including instructions issued in CMPL-60. Deliveries of aluminum castings produced under CMP allotments may be made without further approval if such deliveries do not violate any provisions of the Conservation Order M-1-i, as revised. No shipments of such castings may be made after April 30 except on authorized Controlled Materials Orders or as specifically directed by the Director of the Aluminum and Magnesium Division. Customers not having already done so should be advised to obtain an allotment number from his customer or from the interested Claimant Agency.

This revision of the original plan affects the buyer in several ways. First, all orders received by the supplier which were previously approved by WPB on form PD-26-a for delivery

in March or earlier months and which are not shipped by the supplier prior to May 1, 1943, will have their WPB authorizations withdrawn. CMP allotment numbers must be placed against such orders. Second, orders received by the supplier which were previously approved by WPB on form PD-26-a for delivery in April and which are not shipped by the supplier prior to June 1, 1943, will have WPB authorizations withdrawn. June or subsequent deliveries on such orders cannot be made unless CMP allotment numbers are placed against them.

Third, for aircraft castings to be delivered in May or thereafter, Aircraft Form ASU-3 is obsolete and no longer required as a means of obtaining production and metal allocation approvals from WPB for such aircraft requirements. Fourth, the casting producer, in accordance with WMP regulations as a "producer of controlled materials" is subject to the mandatory procedures as described by the WPB Aluminum and Magnesium Division. The producer is not permitted to process any CMP-4-a or 4-b forms for the trade and such forms should not be sent to the producer. The producer is only interested in receiving an Allotment Number from the purchaser on each order received, and orders received without an allotment number must be rejected.

On purchaser forms CMP-4-a and 4-b, authorization should be requested to purchase castings against specific delivery orders. Requests on these forms are to reflect only the rough weight of the castings to cover such request. Attempts should not be made to calculate ingot tonnage required by the producer to fabricate the poundage of castings applied for, since this is the function of the producer.

Steps that will assure an uninterrupted flow of aluminum castings to the purchaser's plants were outlined. Get allotment numbers for all open orders regardless of date from Claimant Agencies or prime consumers, by filing forms CMP-4-a and 4-b applications. Since CMP-4-a and 4-b applications are made on a quarterly basis, the certification of individual allotment numbers should contain the following: (1) Each order must bear a certification, as required by CMP Reg. No. 3; (2) Each order should have the abbreviated allotment num-



## NON-FERROUS METALS

ber permitted by the regulation, such as C-1-17, S-3-18, or MRO-17; (3) Each order should show the rough weight of castings required for the order bearing an allotment number; (4) the last two digits of the allotment number should indicate the month in which delivery is wanted, and cannot be earlier than permitted on authorized schedules; (5) an allotment number should always be tied in with a specific order or group of orders if they are for the same purpose, and allotment numbers for one program cannot be applied against orders for another.

Manufacturers of aircraft parts, when filing forms CMP-4-a and 4-b covering requests for castings in the third quarter of this year with the Aircraft Division as the Claimant Agency, must designate the type of aluminum required in the manufacture of such castings broken down between primary and secondary metals and their specific alloys.

### Flooded Zinc Mines to Be Pumped and Put to Work

• • • Several hundred million gallons of water will be pumped from a flooded zinc-lead mine in Northeastern Oklahoma by the Bureau of Mines to clear the way for exploration and further development of the property so the output of zinc for war factories can be increased, Secretary of the Interior Harold L. Ickes disclosed recently.

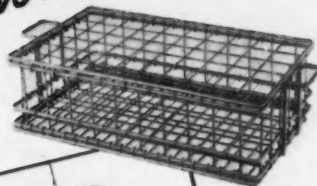
### Magnesium Company Plans Further Expansion

Toronto

• • • Dominion Magnesium Co., which recently completed and put in operation the last two retorts at its \$10,000,000 magnesium plant at Haley's Station, and now is in production at its rated capacity of 10 tons per day, is arranging for further expansion of its production, local officials state. Dr. J. J. McCann, M.P., South Renfrew, stated that there has been authorized by C. D. Howe, Minister of Munitions and Supply, an order to build an alloy mill at the Dominion Magnesium works, with work to start at once. The extension and equipment will be financed by the Canadian government and an appropriation has been sanctioned, he stated.

## Faster "UNIT HANDLING" With WIRE BASKETS

• Union Steel Wire Baskets are being used in war plants to organize production—to handle complete lots in a basket as single units. The object is speed. Stacking type baskets also conserve floor space. Let us see what can be done to speed up some department of your business. Write for illustrated bulletin.



Cap Basket for 75 mm. caps



Shell Case Basket for 40 mm. cases



Heat Treating Baskets



Shell Basket for 75 mm. shells



Wash Basket for 3" Cartridge Cases

Wire Parts for War Use

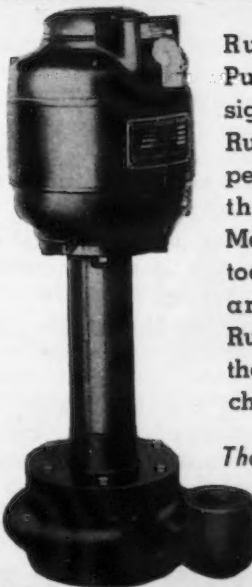


These are only a few of the many wire parts being used for war purposes. Write, Wire or Phone (Albion, No. 147) for quotations or further information on Wire parts or products (woven, welded or formed).

UNION STEEL PRODUCTS COMPANY  
442 Pine St., Albion, Michigan

## UNION STEEL Products

# RUTHMAN



Ruthman Gusher Coolant Pumps are most efficiently designed. This is why today Ruthman pumps are so dependable and stand up under the most grueling usage. Many well known machine tool manufacturers know this and for this reason use Ruthman on their machines thereby making a good machine even better.

The

**RUTHMAN**  
MACHINERY COMPANY  
CINCINNATI, OHIO



## Coolant PUMPS

# SCRAP

... Market Activities and Quotation Trends

## Scrap Trade Dull; First Collections Light

••• The iron and steel scrap trade, for the most part, last week suffered with another dose of the doldrums which have gripped it for several weeks. No area reported really brisk activity although a great deal of variance can be seen in different sectors

*For Pacific Coast comment see page 72. For new Canadian scrap prices see page 125.*

of the country. St. Louis, for instance, complained mainly of low quality material and the added handicap of a labor shortage. Buffalo felt the impact of increased use of hot metal which cut into the demand and also struggled with an intense labor shortage which even Ann Rosenberg, director of New York's WMC region could not solve. Chicago has shown slightly more activity for the past several weeks due to a yard pay agreement which has stimulated movement. Turnings there are again reported super-plentiful. Weather conditions in most of the northern centers has also been a slowing factor in yard production.

Labor conditions in yards are not improving and are becoming a growing source of worry to both dealers and mills who also have not the manpower to process scrap if such becomes necessary. Some yards are saying that it isn't the pay rate so much now as the amount of overtime which will keep men on the job. Slower yard conditions consequently are simply adding to present woes.

Scrap collections are under way in most parts of the country where weather will permit or are about to open up. Many campaigns started April 1 or are scheduled for the 15th. Preliminary reports show tin can collections somewhat better than during the winter and slated to rise with improved weather unless point rationing cuts can consumption too greatly. Initial collections from rural areas are reported bringing in mainly light stuff which is disappointing considering the emphasis which has been placed on the volume of farm scrap. Households have not been very thoroughly attacked yet for scrap this year but Boy Scouts and other civilian organizations will soon tackle this problem. Auto graveyard production in some

areas such as Ohio have reported fairly good tonnages recently while other areas such as Boston currently report very poor jalopy tonnage and equally poor tonnages of obsolete machinery.

April 15 is the date set for an OPA Advisory Committee meeting in Pittsburgh to discuss Revised Price Schedule 4. E. L. Solomon of Max Solomon Co., Pittsburgh, is chairman.

To get your reactions on the scrap outlook for the balance of the year, THE IRON AGE solicits your opinions and letters. Some operators gloomily look for a severe shortage. Others see no critical situation in the offing. Some are struggling with and some claim to have answers to the labor shortage in yards. What is your opinion of the scrap market's future for this year? Base your opinion on facts and quote your source of information. You may be quoted in any opinion printed unless you specify otherwise.

## Navy Has Commissions For Experienced Scrap Men

New York

••• Several weeks ago THE IRON AGE mentioned on this page that the Navy was in the market for some men with scrap trade experience. Individuals throughout the country who have contacted local recruiting offices have not been able to trace down the proper approach and have appealed for assistance. The Naval Procurement offices here have the following to say on the subject:

The Bureau of Supplies and Accounts has need of several men to be assigned to duty administering the Naval scrap metal program. Candidates should be between the ages of 35 and 45 and—

- Should have not less than five years' experience in an executive capacity in the salvage of scrap metals.
- Should have experience in handling business of an annual volume of more than \$1,000,000.
- Should be experienced in all aspects of salvaging ferrous and non-ferrous metals including sources, collection, storage and handling and preparation for use in industry.
- College education is desirable but not essential for appointment.

Candidates must meet naval physical requirements and possess officer-like qualities.

Application should be made to the nearest Office of Naval Officer Procurement. These offices are located in principal cities throughout the United States.

## Scrap Markets

**BUFFALO**—Scrapyard operators reported little activity this week and shipments from dealers to mills showed a falling off. With pig iron freer, more hot iron is being used by the steel mills, enabling them to conserve their stocks of scrap in the face of slowing yard activities. Despite a flying visit to the city by famed Anna M. Rosenberg, WMC regional director in New York City, the labor situation in the yards remained bad.

**ST. LOUIS**—Scrap industries report an easier tone in scrap. Current receipts are ample for all operations though two leading mills complain of lack of high grade material. The main handicap is a severe labor shortage which is holding down output of commercial yards. Tin can collections for war salvage purposes this month total 362 tons which tops the record 360 tons last January.

**CINCINNATI**—While the present picture in the market in this area is not dark, dealers generally feel that in the not too distant future, problems of getting sufficient material are going to be increased. They base their argument on the theory that at the present time there is very little scrap coming out from local sources and district users refuse to accept remote scrap because of present freight rates. Some problems also are reported over allocations but obtaining allocation orders is reported reasonably prompt. One mill continues to be out of the market for all except No. 1 steel and No. 1 bundles, but elsewhere in the district users are apparently receiving sufficient to maintain production.

**BIRMINGHAM**—The scrap situation in this district remains in the doldrums although a little more interest is being shown for steel grades. No pickup in receipts is being experienced by dealers.

**BOSTON**—"No pep" is the general business report by yards and brokers. Continued cold weather plus the yard labor problem are contributing factors to the slow movement. Consensus of opinion is that a stretch of seasonable weather might help, but the trade holds that a real shortage of scrap is in the making. That feeling is perhaps based largely on the dearth of automobile scrap and obso-



## SCRAP

lete machinery. The salvage drive may change the whole picture, it is admitted.

**PITTSBURGH** — There has been no significant change in the scrap market here during the past week.

**PHILADELPHIA**—Shipments from the yards during March are believed to have been the lowest of the winter. Turnings are reported to be moving more slowly than ever. On the whole, little scrap is reaching the yards.

**NEW YORK**—Allocations to the west are about cleaned up, though some for eastern mills are being filled. Turnings are slightly less trouble to move than formerly, it is said, with cast iron grades still in little demand.

**DETROIT**—Receipts and shipments of scrap continues steady and warm weather is leading to the expectation that shipments from the north will begin to increase very soon. Some tightness is noticeable in cast, foundry and electric furnace grades; turnings and borings continue in plentiful supply although turnings movement has been increased by the Washington orders to the mill requiring turnings for at least 8 per cent of their melts.

**CHICAGO**—The inflow of scrap to consumers yards continues at an improved pace, slightly in excess of consumption. However, very little opportunity has been presented to refill stocks depleted during the winter. Many mill buyers feel that this is going to be a slow and difficult procedure and are attempting to get an early start on this in order to have an adequate pile for next winter.

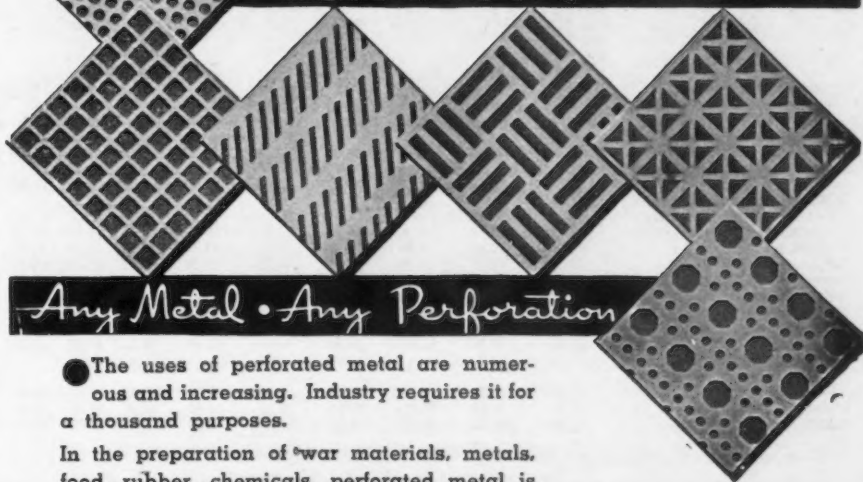
### Furnaces Active 99.7% Of Time During 1942

••• In 1942 about 1200 steel-making furnaces were in operation 99.7 per cent of the time and produced 96.8 per cent of the industry's rated capacity which totaled more than 86,000,000 tons according to the American Iron & Steel Institute. Only 0.3 per cent of the total time was lost through emergency shutdowns.

Open hearth furnaces now producing alloy steels cut the capacity figure somewhat as they can make only three heats of alloy steel in the time required for four plain carbon heats. At the same time alloy steel production has risen until now one out of every six tons of steel produced is alloy. Furnaces are working at capacity yet circumstances prevent reaching the rated capacity.

# PERFORATED METAL

INDUSTRIAL and ORNAMENTAL



Any Metal • Any Perforation

● The uses of perforated metal are numerous and increasing. Industry requires it for a thousand purposes.

In the preparation of war materials, metals, food, rubber, chemicals, perforated metal is required to perform an important role.

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PERFORATING CO.

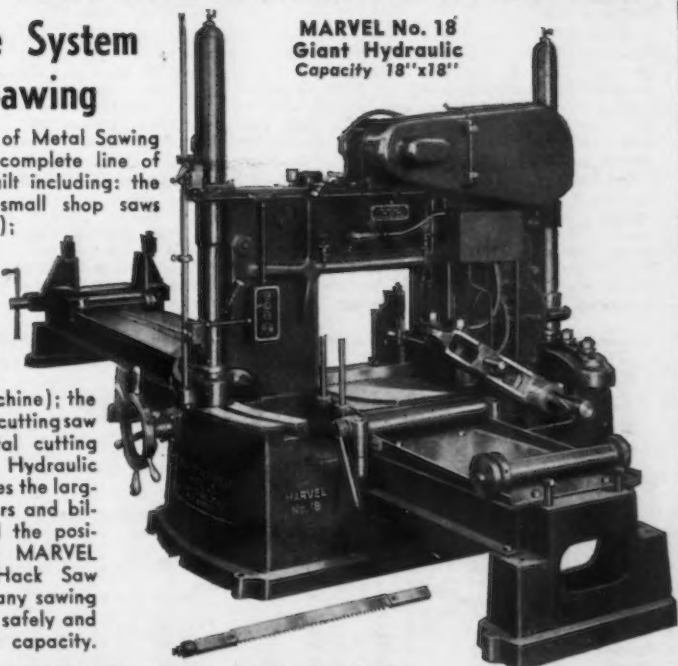
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The Marvel System of Metal Sawing provides the most complete line of sawing machines built including: the most widely used small shop saws (80% are MARVELS); the fastest high speed hack saws built (automatics that will cut-off identical bars with no more operator attention than an automatic screw machine); the most versatile metal cutting saw — (a universal metal cutting band saw). Giant Hydraulic hack saw that handles the largest and toughest bars and billets with ease; and the positively unbreakable MARVEL High-Speed-Edge Hack Saw Blades that permit any sawing machine to operate safely and continuously at full capacity.

MARVEL No. 18  
Giant Hydraulic  
Capacity 18"x18"



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# SCRAP PRICES

## IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

### ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

	BASIC OPEN HEARTH GRADES			BLAST FURNACE GRADES			Low Ph.s.		Heavy Structural and Plate			Foundry Steel				
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Bk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbale <sup>a</sup> Machine Shoo Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crank-shafts	All-y Free Low Phos. Sulphur Turnings	Heavy Axle and Forge Turn. Electric First Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton, Cleveland, Middletown, Cincinnati, Portsmouth, Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point, Ashland, Ky., Buffalo, N. Y., Bethlehem, Pa.; Kokomo, Ind., Duluth, Minn., Detroit, Mich., Toledo, Ohio, St. Louis, Mo., Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburgh, Cal.; San Francisco, Minnequa, Colo., Seattle, Wash.	\$20.00 19.50 18.75 19.50 19.25 18.25 18.00 17.85 17.50 17.50 17.00 16.50 14.50	\$15.00 14.50 13.75 14.50 14.25 13.25 13.00 12.85 12.50 12.50 12.00 11.50 9.50	\$15.00 14.50 13.75 14.50 14.25 13.25 13.00 12.85 12.50 12.50 12.00 11.50 9.50	\$16.00 15.50 14.75 15.50 15.25 14.25 14.00 13.85 13.50 13.50 13.00 12.50 10.50	\$17.00 16.50 15.75 16.50 16.25 15.25 15.00 14.85 14.50 14.50 14.00 13.50 11.50	\$17.50 17.00 16.25 17.00 16.75 15.75 15.50 15.35 15.00 15.00 14.50 14.00 12.00	\$25.00 24.50 23.75 24.50 24.25 23.25 23.00 22.85 22.50 22.50 22.00 21.50 19.50	\$22.50 22.00 21.25 22.00 21.75 20.75 20.50 20.35 20.00 20.00 19.50 19.00 18.50 17.00	\$21.50 21.00 20.25 21.00 20.75 19.75 19.50 19.35 19.00 19.00 18.50 18.00 16.50	\$22.00 21.50 20.75 21.00 20.75 19.75 19.50 19.35 19.00 19.00 18.50 18.00 16.50	\$22.50 22.00 21.25 22.00 21.75 20.75 20.50 20.35 20.00 20.00 19.50 19.00 17.00	\$21.50 21.00 20.25 21.00 20.75 19.75 19.50 19.35 19.00 19.00 18.50 18.00 16.00	\$21.00 20.50 19.75 20.50 20.25 19.25 19.00 18.85 18.50 18.50 18.00 17.50 15.00	\$18.00 17.50 16.75 17.50 17.25 16.25 16.00 15.85 15.50 15.50 15.00 14.50 12.50	\$19.50 19.00 18.25 19.00 18.75 17.75 17.50 17.35 17.00 17.00 16.50 16.00 14.00	\$21.00 20.50 19.75 20.50 20.25 19.25 19.00 18.85 18.50 18.50 18.00 17.50 15.50

\* Baled turnings are \$5 per gross ton higher.

**BUNDLES:** Tin can bundles are \$4 below dealers' No. 2 bundles. No. 3 bundles are \$2 less than No. 1 heavy melting.

**AT NEW YORK** city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.66 per ton.

**SWITCHING CHARGES:** Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati\*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburgh, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. \*At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

**PITTSBURGH** basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

**MAXIMUM** prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

**MAXIMUM SHIPPING POINT PRICE**—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing

point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton\*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.\* For exceptions see official order.

**UNPREPARED SCRAP:** For unprepared scrap, maximum prices shall be \$3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed. For special preparation charges, consult official order.

**CHEMICAL BORINGS:** No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

**UNPREPARED CAST IRON SCRAP**—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their planes. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

\*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

### RAILROAD SCRAP

	Scrap Rails					
	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown, Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown, Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco, Buffalo, Detroit, Duluth, Kansas City, Mo., Kokomo, Ind., Seattle, St. Louis	\$20.50 21.00 19.75 18.00 20.25 18.85 19.00 17.00 19.25 15.50 18.50	\$21.50 22.00 20.75 19.00 21.25 19.85 20.00 18.00 20.25 16.50 19.50	\$23.00 23.50 22.25 20.50 22.75 21.35 21.50 19.50 21.75 18.00 21.00	\$23.50 24.00 22.75 21.00 23.25 21.85 22.00 20.00 22.25 18.50 21.50	\$23.75 24.25 23.00 21.25 23.50 22.10 22.25 20.25 22.50 18.75 21.75	\$24.00 24.50 23.25 21.50 23.75 22.35 22.50 20.50 22.75 19.00 22.00

### CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	\$18.00	\$19.00	\$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.



# Comparison of Prices

Advances Over Past Week in **Heavy Type**; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip .....	2.10	2.10	2.10	2.10
Cold rolled strip .....	2.80	2.80	2.80	2.80
Plates .....	2.10	2.10	2.10	2.10
Plates, wrought iron ....	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic...	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Merchant bars .....	2.15	2.15	2.15	2.15
Cold finished bars .....	2.65	2.65	2.65	2.65
Alloy bars .....	2.70	2.70	2.70	2.70
Structural shapes .....	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00
Wrought iron bars .....	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Plain wire .....	2.60	2.60	2.60	2.60
Wire nails .....	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Heavy rails .....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails .....	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Rerolling billets .....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars .....	34.00	34.00	34.00	34.00
Slabs .....	34.00	34.00	34.00	34.00
Forging billets .....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Wire rods .....	2.00	2.00	2.00	2.00
Skelp (grvd) .....	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
No. 2 fdy., Philadelphia...	\$25.89	\$25.89	\$25.89	\$25.89
No. 2, Valley furnace...	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti...	24.68	24.68	24.68	24.68
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.39
Basic, Valley furnace...	23.50	23.50	23.50	23.50
Malleable, Chicago† ....	24.00	24.00	24.00	24.00
Malleable, Valley .....	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago..	31.34	31.34	31.34	31.34
Ferromanganese† .....	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.  
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Furnace coke, prompt...	\$6.50	\$6.50	\$6.50	\$6.00
Foundry coke, prompt...	7.375	7.375	6.875	6.875

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	Apr. 13, 1943	Apr. 6, 1943	Mar. 16, 1943	Apr. 14, 1942
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.00
Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Lead, St. Louis .....	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic .....	35.00	35.00	35.00	35.00
Magnesium, ingot .....	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 138 to 142.

## Composite Prices . . .

FINISHED STEEL	
Apr. 13, 1943	2.30467c. a Lb.....
One week ago.....	2.30467c. a Lb.....
One month ago .....	2.30467c. a Lb.....
One year ago .....	2.30467c. a Lb.....

HIGH		LOW	
1943.....	2.30467c.,	2.30467c.,	
1942.....	2.30467c.,	2.30467c.,	
1941.....	2.30467c.,	2.30467c.,	
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16	
1939.....	2.35367c., Jan. 3	2.26689c., May 16	
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18	
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4	
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10	
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8	
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2	
1933.....	1.95578c., Oct. 3	1.75836c., May 2	
1932.....	1.89196c., July 5	1.83901c., Mar. 1	
1931.....	1.99626c., Jan. 13	1.86586c., Dec. 29	
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9	
1929.....	2.31773c., May 28	2.26498c., Oct. 29	

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON	
.....	23.61 a Gross Ton.....
.....	23.61 a Gross Ton.....
.....	23.61 a Gross Ton.....
.....	23.61 a Gross Ton.....

HIGH		LOW	
.....	\$23.61	\$23.61	
.....	23.61	23.61	
23.61, Mar. 20	23.45, Jan. 2		
23.45, Dec. 23	22.61, Jan. 2		
22.61, Sept. 19	20.61, Sept. 12		
23.25, June 21	19.61, July 6		
23.25, Mar. 9	20.25, Feb. 16		
19.74, Nov. 24	18.73, Aug. 11		
18.84, Nov. 5	17.83, May 14		
17.90, May 1	16.90, Jan. 27		
16.90, Dec. 5	13.56, Jan. 3		
14.81, Jan. 5	13.56, Dec. 6		
15.90, Jan. 6	14.79, Dec. 15		
18.21, Jan. 7	15.90, Dec. 16		
18.71, May 14	18.21, Dec. 17		

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

SCRAP STEEL	
.....	\$19.17 a Gross Ton.....
.....	\$19.17 a Gross Ton.....
.....	\$19.17 a Gross Ton.....
.....	\$19.17 a Gross Ton.....

HIGH		LOW	
.....	\$19.17	\$19.17	
.....	19.17	19.17	
\$22.00, Jan. 7	\$19.17, Apr. 10		
21.83, Dec. 30	16.04, Apr. 9		
22.50, Oct. 3	14.08, May 16		
15.00, Nov. 22	11.00, June 7		
21.92, Mar. 30	12.67, June 9		
17.75, Dec. 21	12.67, June 9		
13.42, Dec. 10	10.33, Apr. 29		
13.00, Mar. 13	9.50, Sept. 25		
12.25, Aug. 8	6.75, Jan. 3		
8.50, Jan. 12	6.43, July 5		
11.33, Jan. 6	8.50, Dec. 29		
15.00, Feb. 18	11.25, Dec. 9		
17.58, Jan. 29	14.08, Dec. 3		

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

# Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
<b>SHEETS</b>															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled <sup>1</sup>	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes <sup>2</sup>	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
<b>STRIP</b>															
Hot rolled <sup>3</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled <sup>4</sup>	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)				3.07¢	3.33¢	
<b>TIN MILL PRODUCTS</b>															
Coke tin plate, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.38¢	5.34¢
Electrolytic tin plate, box	\$4.50		\$4.50												
Black plate, 29 gage <sup>5</sup>	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ <sup>12</sup>			3.39¢
Mfg. ternes, special box	\$4.30	\$4.30	\$4.30						\$4.40						
<b>BAR</b>															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel <sup>6</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢ <sup>13</sup>	2.27¢	2.40¢	
Reinforcing (rail) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢ <sup>13</sup>	2.27¢		2.49¢
Cold finished <sup>8</sup>	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton = 2.70¢)				2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
									(Coatesville and Claymont = 2.10¢)						
<b>PLATES</b>															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ <sup>11</sup>		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)					3.97¢	4.15¢		3.71¢	3.60¢
<b>SHAPES</b>															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.47¢	2.75¢		2.28¢	2.22¢
<b>SPRING STEEL, C-R</b>															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
<b>WIRE<sup>9</sup></b>															
Bright <sup>10</sup>	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.94¢
Galvanized															
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.70¢			3.54¢
<b>PILING</b>															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢

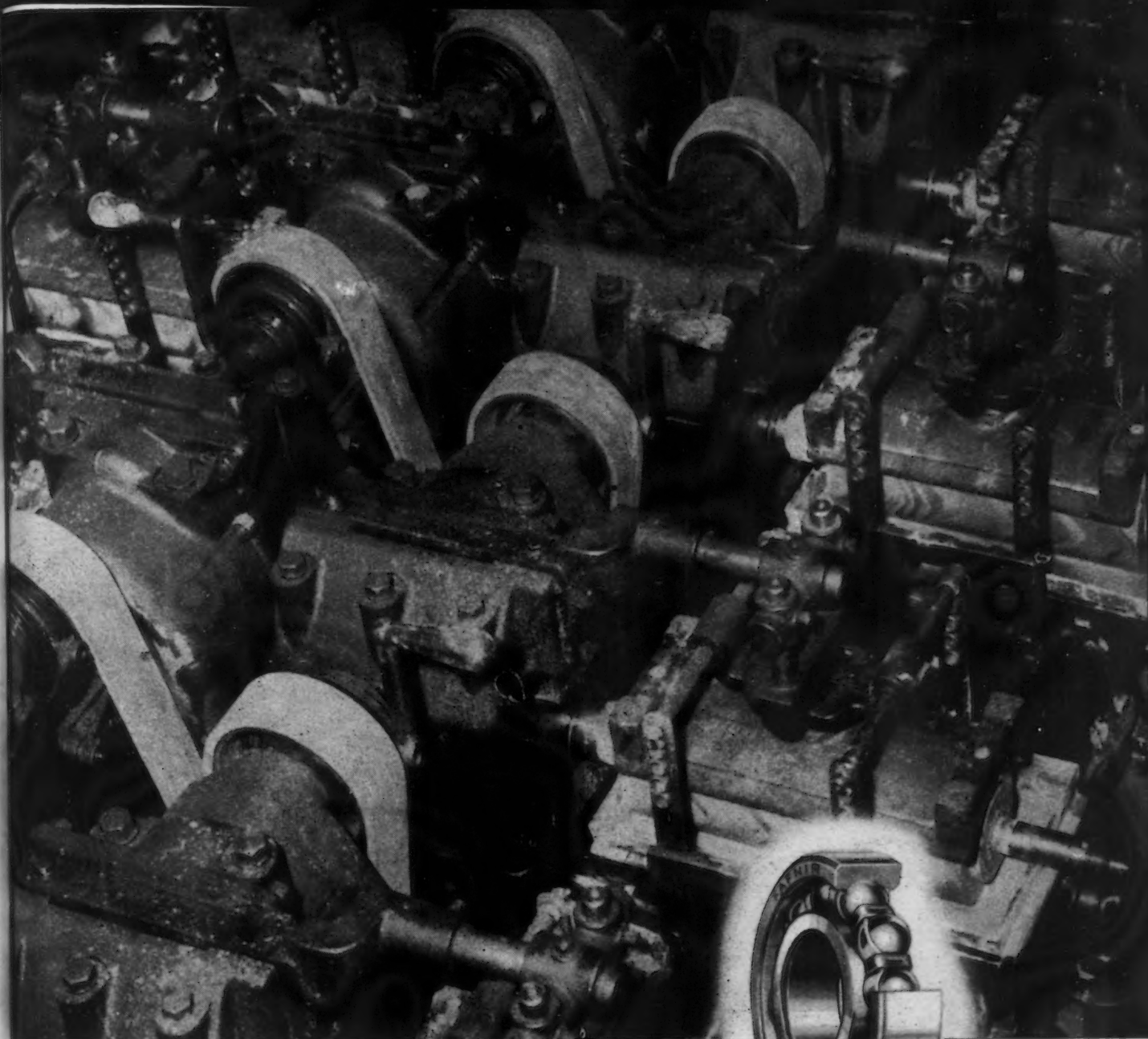
<sup>1</sup> Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. <sup>2</sup> Unassorted 8-lb. coating. <sup>3</sup> Widths up to 12 in. <sup>4</sup> Carbon 0.25 per cent and less. <sup>5</sup> Applies to certain width and length limitations. <sup>6</sup> For merchant trade. <sup>7</sup> Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. <sup>8</sup> Also shafting. For quantities of 20,000 to 39,999 lb. <sup>9</sup> Carload lot to manufacturing trade. <sup>10</sup> These prices do not apply if the customary means of transportation (rail and water) are not used. <sup>11</sup> Ship plates only. <sup>12</sup> Boxed. <sup>13</sup> Portland and Seattle price, San Francisco price is 2.50c. <sup>14</sup> This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

**GOVERNMENT CEILINGS**—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

**EXCEPTIONS TO PRICE SCHEDULE No. 6**—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points, Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. **SEMI-FINISHED STEEL**—Follansbee Steel Corp. may sell forging billets at \$49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at \$34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at \$34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at \$50 at established basing points and slabs at \$41; Empire Sheet and Tin Plate may sell slabs at \$41 at established basing points and sheet bars at \$39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge \$41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge \$36 per ton for small billets, f.o.b. Portsmouth and \$37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. **ALLOY STEEL BARS**—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.



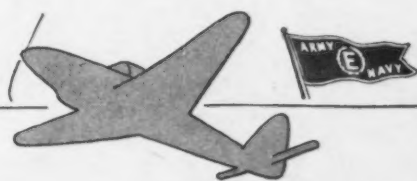


# AN ARMY that marches on a Factory Floor

Imagine! . . . you surely can . . . the prodigious number of industry's "marching" machines. These machines never hear such a command as, "at ease"! They keep up the same relentless pace through one shift and the next . . . 24 hours every day. They keep our pilots in the air. They keep our tanks rolling. They keep our fighting men on the go, with blazing guns. Their steady whirring, humming, clicking, pounding is the Victory song of the nation!

The Fafnirs working here . . . 7 of them in each gear-box, 28 more on the shafting of this 100-foot machine . . . are built to *stay on the job* under tough, abrasive conditions. Like the millions of Fafnirs serving with the fighting forces, and the millions in other industrial machines here at home . . . these Fafnirs are "taking it". Their service records can already be stamped, "far

beyond the call of normal duty"! The Fafnir Bearing Company, New Britain, Connecticut.



## FAFNIR

### BALL BEARINGS

THE BALANCED LINE - FOR ORDNANCE,  
AIRCRAFT AND INDUSTRIAL MACHINERY

# PRICES

## SEMI-FINISHED STEEL

For exceptions, see preceding page

### Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.25 higher; f.o.b. Duluth, billets only, \$2 higher. Delivered prices do not reflect new per cent tax on freight rates.

Per Gross Ton

Rerolling ..... \$34.00  
Forging quality ..... 40.00  
Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton..... \$54.00

### Shell Steel

Per Gross Ton

3 in. to 12 in. .... \$52.00  
12 in. to 18 in. .... 54.00  
18 in. and over ..... 56.00  
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham. Prices delivered Detroit are \$2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer ..... \$34.00

### Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared ... 1.90c.

### Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland ... 2.00c.  
Worcester, Mass. .... 2.10c.  
Birmingham ..... 2.00c.  
San Francisco ..... 2.50c.  
Galveston ..... 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

## TOOL STEEL

(F.o.b. Pittsburgh; Bethlehem, Syracuse)

Base per lb.

High speed ..... 67c.  
Straight molybdenum ..... 54c.  
Tungsten-molybdenum ..... 57½c.  
High-carbon-chromium ..... 43c.  
Oil hardening ..... 24c.  
Special carbon ..... 22c.  
Extra carbon ..... 18c.  
Regular carbon ..... 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

## CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

### Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

### Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

### Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

\*Includes annealing and pickling.

## N. E. STEELS (Hot Rolled) Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/.33	1.60/1.90	.040	.040	.20/.35				.10c	\$2.00		
NE 1335	.33/.38	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1340	.38/.43	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1345	.43/.48	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 1350	.48/.53	1.60/1.90	.040	.040	.20/.35				.10	2.00		
NE 8020	.18/.23	1.00/1.30	.040	.040	.20/.35			.10/.20	.45	9.00	.95c	\$19.00
NE 8442*	.40/.45	1.30/1.60	.040	.040	.20/.35			.30/.40	.90	18.00	1.40	28.00
NE 8613	.12/.17	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8615	.13/.18	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8617	.15/.20	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8620	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8630	.28/.33	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8635	.33/.38	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8637	.35/.40	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8640	.38/.43	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8642	.40/.45	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8645	.43/.48	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8650	.48/.53	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00
NE 8720	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.20/.30	.80	16.00	1.30	26.00
NE 9255	.50/.60	.70/.95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/.65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/.65	.75/1.00	.040	.040	1.80/2.20	.20/.40			.65	13.00		
NE 9415	.13/.18	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30c	\$26.00
NE 9420	.18/.23	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9422	.20/.25	.80/1.10	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9430	.28/.33	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9435	.33/.38	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9437	.35/.40	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9440	.38/.43	.90/1.20	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.80	16.00	1.30	26.00
NE 9442	.40/.45	1.00/1.30	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.85	17.00	1.35	27.00
NE 9445	.43/.48	1.00/1.30	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.85	17.00	1.35	27.00
NE 9450	.48/.53	1.20/1.50	.040	.040	.40/.60	.20/.40	.20/.50	.08/.15	.85	17.00	1.35	27.00
NE 9537*	.35/.40	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9540*	.38/.43	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9542*	.40/.45	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9550*	.48/.53	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00
NE 9630	.28/.33	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9635	.33/.38	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9637	.35/.40	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9640	.38/.43	1.20/1.50	.040	.040	.40/.60	.40/.60			.80	16.00	1.30	26.00
NE 9642	.40/.45	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00
NE 9645	.43/.48	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00
NE 9650	.48/.53	1.30/1.60	.040	.040	.40/.60	.40/.60			.85	17.00	1.35	27.00

\*Recommended for large sections only. Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, \$5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

## ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh) Per Lb.

Field grade ..... 3.20c.  
Armature ..... 3.55c.  
Electrical ..... 4.05c.  
Motor ..... 4.95c.  
Dynamo ..... 5.65c.  
Transformer 72 ..... 6.15c.  
Transformer 65 ..... 7.15c.  
Transformer 58 ..... 7.65c.  
Transformer 52 ..... 8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

## WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

Base per Keg

Standard wire nails ..... \$2.55  
Coated nails ..... 2.55  
Cutnails, carloads ..... 3.85

Base per 100 Lb.

Annealed fence wire ..... \$3.05  
Annealed galvanized fence wire ..... 3.40

Base Column

Woven wire fence\* ..... 67  
Fence posts (carloads) ..... 69  
Single loop bale ties ..... 59  
Galvanized barbed wire† ..... 70  
Twisted barless wire ..... 70

\*15½ gage and heavier. †On 80-rod spools in carload quantities.

## RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb. gross ton ..... \$40.00  
Angle bars, 100 lb. .... 2.70  
(F.o.b. Basing Points) Per Gross Ton  
Light rails (from billets) ..... \$40.00  
Light rails (from rail steel) ..... 39.00

Base per Lb.

Cut spikes ..... 3.00c.  
Screw spikes ..... 5.15c.  
Tie plates, steel ..... 2.15c.  
Tie plates, Pacific Coast ..... 2.30c.  
Track bolts ..... 4.75c.  
Track bolts, heat treated, to railroads ..... 5.00c.  
Track bolts, jobbers discount ..... 63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

## ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C. ...	\$6.00	\$12.00
15-lb. coating I.C. ...	7.00	14.00
20-lb. coating I.C. ...	7.50	15.00